

DOCUMENT RESUME

ED 158 148

CE 017 823

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TITLE A System for Evaluating Career Education in Minnesota: 1972-73. A Final Report of Exemplary Programs in Career Education.
INSTITUTION Minnesota Research Coordinating Unit for Vocational Education, Minneapolis.
PUB DATE Jan 74
NOTE 76p.
EDRS PRICE MF-\$0.83 HC-\$4.67 Plus Postage.
DESCRIPTORS *Academic Achievement; Achievement Rating; *Career Education; Cognitive Tests; Demonstration Programs; *Demonstration Projects; Elementary Education; Evaluation Methods; *Formative Evaluation; Junior High Schools; *Program Development; Program Evaluation; Self Evaluation; Student Evaluation; *Summative Evaluation
IDENTIFIERS Minnesota

ABSTRACT

An evaluation was conducted on seven career education projects in seven Minnesota school districts. Formative and summative evaluation methods were used to assess teachers' and directors' project implementation and the impact on students' (grades 1 to 9) cognitive achievement. Self evaluation forms were used to obtain information from and to provide feedback to teachers and directors. These forms, collected over seven months, provided a baseline which was used to detect differences in implementation strategies. It was concluded that the seven projects implemented career education in different ways, utilized different instructional techniques, differed in average number of activities conducted, and distributed the instruction and preparation amount differently among activities conducted. Experimental students (who had had career education) and control students (who had not had career education) were administered tests designed to assess the impact of career education on their cognitive achievements. The tests, reliable for both experimental and control groups, detected relatively large differences among grades (maturity levels) for both groups. Small achievement differences, sometimes inconsistent, were found between the experimental and control groups and among the seven experimental projects. The relative impact of career education instruction on the cognitive achievement of students was small and not educationally significant. (Author/CSS)

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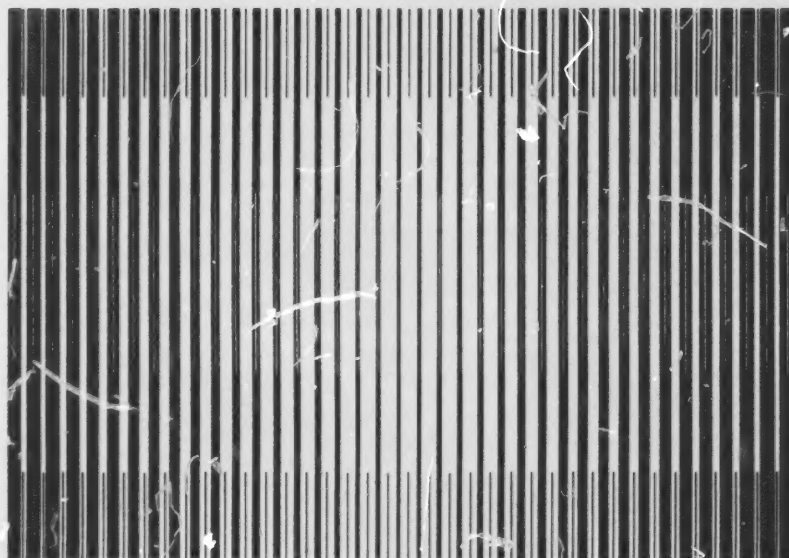
ED158148

A System for Evaluating Career Education in Minnesota: 1972-73

A Final Report of Exemplary Programs
in Career Education

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U.S. DEPARTMENT OF HEALTH,
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THE MINNESOTA RESEARCH COORDINATING UNIT FOR VOCATIONAL EDUCATION performs the following four functions in behalf of the State and national systems of vocational education:

1. Stimulate, facilitate and coordinate innovative research and development efforts.
2. Disseminate research-related information to assist research and development efforts and to speed the implementation of worthy educational innovations.
3. Increase the number and improve the competence of producers and consumers of vocational research-related materials.
4. Create knowledge and useful products that have potential for making long-range and general qualitative improvements in vocational education.

ACKNOWLEDGEMENTS

The members of the staff of the Minnesota Research Coordinating Unit for Vocational Education and the Division of Vocational and Technical Education, State Department of Education wish to take this opportunity to express their appreciation to three groups of individuals who participated and/or cooperated in the conduct of these evaluation studies.

First, we wish to recognize the cooperation that students, teachers, and directors in the exemplary projects demonstrated by providing the data used to develop this report. While it is not possible to list all of the individuals in the exemplary projects, we would at least like to recognize the directors of each of the eight exemplary projects: Donald Barber, Owatonna; Robert Olsen, Osseo; Pete Martens, Red Wing; Jerry Johnson, Plainview; Donald Kellen, Willmar; Dale Abbott, Cloquet; Vernon Vick, Roseville; Ronald Johnstone, White Bear Lake.

Second, we wish to give special recognition to those students, teachers, and especially the principals of several schools who cooperated in the evaluation even though they were not formally involved with the career education project. The principals of these schools deserve special recognition for the professional way in which they cooperated with the project: Mr. Dennis Deanovic, Faribault Elementary School; Mr. Robert Hall, Faribault Junior High School; Mr. Kenneth Prihoda, Hutchinson Elementary School; Mr. Ralph Bergstrom, Hutchinson Junior High School; Mr. Virgil Green, Zumbrota Elementary School; Mr. Richard Whitaker, Zumbrota Junior High School.

Last, we wish to acknowledge the cooperation of various business and industrial agencies who provided materials that were vital to the development of the career education tests: Leiner Publications, Minneapolis; Greyhound Bus Company, Minneapolis; U. S. Bureau of Mines, St. Paul; U.S. Department of Commerce, St. Paul; U. S. Department of the Interior, St. Paul; U. S. Air Force, Minneapolis; Northwest Airlines, St. Paul; Anoka Vocational Technical Institute, Anoka; Mayo Clinic, Rochester; Minnesota Mining and Manufacturing Company, St. Paul; Ford Motor Company, Chicago.

It is anticipated that more than 20,000 individuals participated in and devoted considerable amounts of time to the evaluation project. It would not have been possible to develop and operate the evaluation system without this type of professional contribution.

ABSTRACT

Introduction

The state of Minnesota used its funds designated for career education to support eight (8) school districts in the implementation of career education. Each school district proposed a different way to implement career education. The purpose of this report is to present and discuss the findings of the first year's evaluation of seven of the participating projects as they relate to (a) the processes teachers and project directors used to implement career education and (b) the impact that career education instruction had on the cognitive achievements of students.

The Minnesota Research Coordinating Unit for Vocational Education designed and operated a system of formative and summative evaluation to assess the processes used to implement career education as well as assess the impact that career education instruction had on students in grades 1-9. The findings of the study are presented and discussed separately for the formative (Part I) and summative (Part II) evaluations. These sections are followed by a general discussion of both sets of findings (Part III).

Formative Evaluation of Instructional Processes

Two self-evaluation forms were developed to obtain information from and provide continuous monthly feedback to the project directors and participating teachers in each of the seven exemplary projects concerning the processes they used to implement career education. The project directors reported the type and amount of support activities conducted each month and received a cumulative summary of these activities from the Minnesota RCU. Each participating teacher "described" the type and amount of time spent on career education instruction conducted each month using a specially designed form set up for optical scanning and computer analysis. A one page, computer summary report of these instructional activities was provided to teachers and project directors periodically during the academic year. The purpose of these data was (a) to obtain baseline information about the methods used to implement career education and (b) to detect differences that may exist among the seven projects in terms of implementation strategies.

Based on the data provided by project directors and teachers for a seven month period, the processes used to implement career education in the exemplary projects may be described in the following manner:

1. On the average, a project director devoted about seventeen percent of his time to administering, supervising, and planning career education activities. These activities included (a) attending and making presentations at twenty local, state, and national meetings, (b) preparing and distributing about eighty different pieces of promotional information about career education, (c) providing in-service training for about 350 teachers, (d) purchasing and developing about 300 different curriculum or instruction materials, and (e) organizing career guidance services for 450 teachers and 3200 students.

2. Teachers, on the average, spent about three percent (2.43%) of their time (about seven hours a month or 1.5 hours per week) conducting twenty (20) separate activities related to career education that (a) were integrated with their regular course content, (b) consumed (on the average) about thirty-five (35) hours of instruction and preparation time, (c) emphasized three major concepts related to career education (self-awareness, occupation industries, and work roles), and (d) utilized a range of instructional techniques to implement career education. The most frequently used techniques were those that could most readily be used in a classroom (e.g. A-V presentations, workers in class, career games, etc.).

The instructional profile described is based on data obtained from all participating teachers and, as such, represents the average profile. Additional analysis of the data showed that each exemplary project differed considerably in terms of the way in which career education was implemented.

Some of the largest differences in instruction were in terms of: (a) The type and amount of emphasis on support services (e.g. counseling, in-service training, and promotional activities, etc.), (b) the number of instructional activities conducted, (c) the amount of instruction and preparation time devoted to career education, (d) the frequency with which instructional techniques were used, and (e) the amount of instructional time devoted to various instructional techniques. It was apparent that teachers within each project used a wide range of instructional techniques which were integrated with their regular course content to implement career education, but it was also apparent that teachers placed less instructional emphasis on the concepts of work requirements, career decision making and occupational levels than they did on other areas of content.

It may be concluded that the seven exemplary projects did, in fact, implement career education in different ways; they utilized different instructional techniques, they differed in the average number of activities conducted, and they distributed the amount of instruction and preparation differently among the activities conducted. It remains to be seen whether these instructional differences have a differential impact on the subsequent achievements of their students.

Summative Evaluation of Student Achievement

Students in both experimental and control groups were administered specially developed career education tests designed to assess the impact of career education on their cognitive achievements. Experimental and control groups were identified by the project directors or by principals of schools, as groups of students who had and had not received formal instruction in career education respectively.

The purposes of the study were to determine whether (a) the career education tests were reliable and sensitive to differences among grade levels in terms of student achievement, (b) there were differences between matched groups of experimental and control groups in terms of student achievement, and (c) there were differences among the seven exemplary projects in terms of student achievement.

Analysis of the data revealed the following:

1. The tests were equally reliable for both experimental and control groups, but the 4-6 and 7-9 tests were more reliable than the 1-3 test.
2. The tests consistently detected relatively large differences among grade (maturity) levels for both experimental and control groups.
3. Differences in student achievement were detected for experimental and control groups, but these differences were generally very small and not always in favor of the experimental groups.
4. Differences in student achievement were detected among the seven experimental projects, but those differences were generally quite small and not consistent among grade levels. That is, achievement scores of students at certain grade levels were higher than those of students in other projects, but the opposite was true at other grade levels.

These findings suggest that (a) the tests were reliable and capable of detecting differences where, in fact, differences exist, and that (b) the relative impact of career education instruction on the cognitive achievement of students was small and not educationally significant.

Interpretation/Findings

Four plausible explanations for not finding larger differences in the mean scores of students in experimental and control groups or among the students in the exemplary projects were discussed. First, it is possible that the tests did not adequately sample the content emphasized by teachers in the exemplary projects. Second, teachers in the control schools had perhaps been teaching career education concepts and thus, had an instructional program similar to teachers in the exemplary projects. Third, the amount of instructional emphasis and time devoted to career education was inadequate (1.5 hours per week) to make an impact on the cognitive achievements of students in the exemplary projects. Fourth, one year of career education instruction may be insufficient to demonstrate observable changes in the cognitive achievement of students. The findings also may suggest that integration of career education concepts with regular course content may not be the best instructional strategy for impacting student achievement. Additional research and evaluation of the instruments and instructional strategies are needed to provide answers to many of the questions suggested by this report.

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A SYSTEM FOR EVALUATING CAREER EDUCATION IN MINNESOTA: 1972-1973

Forward

The state of Minnesota, for the past three years, has received federal funds authorized under Part C of the Vocational Education Amendments of 1968 to support demonstration projects in career education. These funds have been used to establish, develop and implement career education in eight different school districts which currently serve as demonstration sites for other schools in the State. Because one of the schools dropped out of the project and was replaced by another school, only seven schools participated in the evaluation processes.

Each of the seven school districts was selected on the strength of its proposal and the unique way in which it planned to implement career education. It was perceived that the seven site model, together with a comprehensive system of evaluation, was the most effective and efficient strategy for obtaining empirical baseline information about programmatic efforts directly related to the implementation of career education.

The Minnesota Research Coordinating Unit for Vocational Education (RCU), located at the University of Minnesota, in cooperation with the directors of the career education projects and the Vocational Division, State Department of Education, was given the responsibility to develop a comprehensive system of formative and summative evaluation. The purpose of the evaluation was to provide empirical data to various groups of decision makers at the local and state level in order that both the quality and quantity of career education could be enhanced.

The purpose of this report is to present and discuss the findings of the first year's evaluation of seven career education projects in Minnesota. The report is divided into three parts. Part I pertains to the "processes" used by each of the seven school districts to implement career education concepts. Part II presents information concerning the "product" outcomes of the projects in terms of the cognitive achievement of students concerning concepts related to the world of work. Part III describes the relationship between the process and product evaluations in terms of the relative impact the programs had on students.

PART I

A SYSTEM OF FORMATIVE EVALUATION OF THE PROCESSES USED TO IMPLEMENT CAREER EDUCATION

INTRODUCTION

A comprehensive system for evaluating developmental projects in career education must provide information to various groups of decision makers (e.g. teachers, local project directors, state department personnel) concerning both process and product outcomes. In the early stages of development, it is important to develop a system of formative evaluation which provides empirical information about the quantity and types of "processes" used to implement career education. Formative evaluation implies a systematic process of providing local decision makers (project directors and teachers) with relevant information such that immediate changes may be made in their program.

The purpose of Part I of this report is to discuss the system used to conduct a formative evaluation of the processes used to implement career education in the seven different school districts and descriptively compare the career education projects in terms of the types of activities and amount of time each devoted to career education. The objectives of the study were:

- (1) To determine whether there were differences among the seven career education projects in terms of the type and/or relative amount of support service activities.
- (2) To determine whether there were differences among the seven career education projects in terms of the (a) number of career education activities conducted, (b) type of curriculum organization, (c) amount of time devoted to instruction and (d) content emphasis.
- (3) To determine whether there were differences among the seven career education projects in terms of the types of instructional methods used to implement career education.

PROCEDURES

Instrument Development

Two separate self evaluation instruments were used to obtain information from (1) the project directors and other support personnel and (2) teachers who were participating in the career education project. Data were collected each month for the last seven months of the 1972-73 school year.

Discussions with the directors of the seven career education projects and selected staff from the Minnesota State Department of Education were conducted.

in the spring of 1972 for the purpose of developing an effective and efficient system for conducting a formative evaluation of the processes used to implement career education. The requirements of the system included the following concerns:

- (1) The instruments used should be comprehensive, and require minimal time to complete.
- (2) The system should be capable of providing feedback to local directors and teachers on a monthly and/or quarterly basis.
- (3) The system should be capable of aggregating data by project, school, month, grade level or curriculum area.
- (4) The turnaround time for providing feedback should be minimal (one to two weeks).

One instrument was designed to obtain information from local project directors and other support personnel concerning the type and amount of services they provided (See Appendix A). The types of services were classified in the following manner: (1) general administrative duties, (2) promotional activities, (3) curriculum and instructional materials, (4) in-service training activities, and (5) counseling and guidance activities. Data were collected from directors each month for seven months. Both monthly totals and cumulative totals were recorded on separate forms by the staff of the Minnesota RCU and returned to directors each month.

An alternative strategy had to be used to obtain descriptive information about career education activities from teachers. A self-evaluation form was designed which would be non-threatening to classroom teachers. Because of the relatively large numbers of teachers involved (about 500) an efficient system of data collection and analysis had to be developed. Consequently, a form was developed in which the data could be read by optical scanning equipment and analyzed by computer.

The staff of the Minnesota RCU met with several teachers and project directors during the summer of 1972 for the purpose of identifying and classifying (a) the various types of instructional methods most frequently used to teach career education concepts and (b) the content areas related to career education. By referring to the rationale and model for career education developed by the staff of the Minnesota RCU, a prototype of an optical scan instrument, which incorporated most of the ideas of the teachers and directors, was developed and pre-pilot tested with about one hundred (100) teachers.

The final form of the instrument was developed by the staff of the Minnesota RCU with consultation from the staff at the University of Minnesota, Student Counseling Bureau, and printed in booklets containing twelve (12) 11" x 17" forms which could be easily removed from the booklet (See Appendix B). Each form provided teachers the opportunity to "describe" twenty different instructional activities each month simply by darkening the appropriate circles. Teachers were directed to complete the form immediately after an activity had been conducted and return it to the project director at the end of each month.

The instrument was divided into three parts. The first part contained teacher identification information (project, school and teacher codes, grade

level, number of students, month and curriculum area). The second part contained information about the amount of preparation and instruction time in relationship to: (a) thirteen different methods of instruction and (b) three types of curriculum organization. In addition, teachers were asked to indicate the number of students who received instruction and evaluate the activity in terms of student interest or motivation. The last part of the form allowed teachers to indicate the content emphasis for each instructional activity and the amount of time required to "describe" each activity.

Data Analysis

Special optical scan programs were developed by the staff at the Student Counseling Bureau to "read" the data on each form. Data were read by the optical scanner and written to a magnetic tape. A series of four specially developed computer programs were developed to analyze and summarize the data into a one page computer table (See Appendix C). Data could be aggregated for any combination of the six teacher codes (project, school, teacher, grade, month or curriculum area) which appear on the form in terms of "totals" or "averages".

Data Collection

The forms were collected and edited for accuracy and completeness by each project director or his designate at the end of the month. Forms were then sent to the Minnesota RCU and scored by the Student Counseling Bureau. Data were edited by special computer programs, corrected by the staff of the RCU and then re-scored. Data were accumulated for each participating teacher for seven academic months.

Teachers and project directors were provided with computer printouts at five different times during the year. The first analysis summarized three months of data (October - December). Separate printouts were provided for the month of January, February and March. The last set of printouts summarized all seven months of data and provided totals and averages for each of the following categories: (1) project, (2) school, (3) teacher, (4) grade and (5) curriculum area(s).

Population and Sample

A total of seven different school districts participated in the process evaluation. (One school was eliminated from the evaluation because it was placing emphasis on in-service training and curriculum development rather than engaging in instructional processes.) These are designated in the report as projects 01 through 07 respectively. There was a total of 498 teachers who participated in the project; 325 elementary teachers; 110 junior high school teachers; 13 senior high school teachers. Table 1 shows the number of teachers by grade level and project who participated in the process evaluation.

Table 1

NUMBER OF TEACHERS BY GRADE LEVEL WHO PARTICIPATED
IN EACH OF SEVEN CAREER EDUCATION PROJECTS

Project	Elementary	Junior High	Senior High	Total
01	8	15	12	33
02	15	7	1	23
03	113	--	--	113
04	21	23	--	44
05	122	67	--	189
06	57	--	--	57
07	39	--	--	39
Total	375	110	13	498

The project director, through a series of in-service workshops, identified the teachers within his project who were to participate in the evaluation.

Each participating teacher was asked to complete a biographical data sheet (See Appendix D). This information is summarized in Table 2. A total of 452 of the sheets were received which represented about a ninety-one percent (91%) return. Averages or percents are based on only the teachers who returned the form and are shown separately for each project and for the total group of teachers.

The average teacher who participated in the career education project had (a) taught for about nine (9) years, (b) two (2) years of non-teaching work experience and (c) been out of high school for about sixteen (16) years. A majority (68%) received their education within a comprehensive high school curriculum while relatively few (2%) studied in a vocational high school. Approximately three-fourths of the teachers were raised in either a small town or rural area and the other one-fourth were raised in either a urban or suburban area. Most of the teachers (84%) had only a bachelor's degree; relatively few (16%) had any work beyond the bachelor's degree.

The characteristics of teachers in each of the projects seem to be quite similar. Two of the projects (02 and 03) may have a slightly younger staff than the other projects; the staff in three projects (01, 02, and 04) seem to

Table 2

SUMMARY OF TEACHER CHARACTERISTICS FOR
EACH CAREER EDUCATION PROJECT

Characteristics	Projects							Totals Average N=452
	01 N=33	02 N=11	03 N=106	04 N=32	05 N=184	06 N=56	07 N=30	
Average Years of Teaching	10	7	6	10	10	8	10	9
Average Years of Work Experience	4	3	1	3	2	1	1	2
Average Years Since High School Grad.	18	14	13	16	16	13	22	16
High School Curriculum								
General Curriculum	36%	9%	33%	34%	40%	25%	33%	30%
Comprehensive Curriculum	58%	91%	66%	66%	58%	73%	67%	68%
Vocational Curriculum	6%	0%	1%	0%	2%	2%	0%	2%
Current Degree								
Percent B.S.	26%	82%	54%	34%	37%	34%	73%	49%
Percent B.S.+	29%	18%	42%	47%	39%	50%	23%	35%
Percent M.S.	14%	0%	5%	9%	10%	13%	3%	8%
Percent M.S.+	31%	0%	0%	9%	15%	4%	0%	8%
Percent Ph.D.	0%	0%	0%	0%	0%	0%	0%	0%
Residence								
Percent Rural	19%	27%	34%	28%	29%	21%	30%	27%
Percent Small Town	57%	36%	47%	53%	48%	23%	57%	46%
Percent Urban	22%	18%	8%	16%	16%	21%	10%	16%
Percent Suburban	3%	18%	11%	3%	7%	34%	3%	11%
In-Service Training								
Average Number of Field Trips	5	3	2	2	2	1	1	2
Average Number of College Credits	2	0	.4	.2	1	.3	.4	1
Average Number of Hours in Workshops	34	27	1	15	7	2	1	12
Average Number of Hours in Meetings	5	5	2	13	6	1	1	5
Curriculum Development Activities								
Percent Participating	58%	27%	9%	22%	12%	4%	10%	20%
Percent Not Participating	42%	73%	91%	78%	88%	96%	90%	80%
Average Number of Hours in Activities	23	24	8	51	1	2	4	16

have had more work experience. A higher percent of teachers in one project (02) participated in a comprehensive high school curriculum than was the case in the other projects; only one project (01) appeared to have more teachers who had participated in a secondary vocational curriculum than the other six projects. Also, regardless of school district location, most of the teachers in each project were raised in a small town or rural community.

On the average, each teacher had (a) a bachelor's degree, (b) participated in two (2) field trips to industry, (c) obtained college credit for one or more career education courses, (d) twelve (12) hours of experience in career education workshops and (e) devoted about five (5) hours to career education meetings. In addition, about twenty percent (20%) of the teachers averaged sixteen (16) hours of time developing curriculum materials related to career education prior to the start of the 1972-73 school year.

There appear to be some differences among projects in terms of the teachers' prior involvement in career education training activities. Teachers in three projects (01, 02, and 04) appear to have been involved in more workshops and meetings than teachers in the other projects. Two projects (01 and 02) had involved a higher percent of their staff in the development of curriculum materials than the other five projects.

In general, it would appear that the teachers who participated in the career education project had a rather limited work experience (excluding the teaching profession). It also appeared that the directors of the projects recognized this fact and attempted to provide a variety of in-service training activities to compensate for this lack of experience.

Validity and Reliability of Data

Because the findings and conclusions of this report are dependent upon obtaining valid and reliable data from teachers, two separate analyses of the scoring system were conducted. The first analysis pertains to the effectiveness and efficiency of the scoring system and the second pertains to the accuracy of the data as perceived by the teachers who participated in the evaluation process. A summary of this evaluation is shown in Appendix E.

FINDINGS

Objective 1:

To determine whether there were differences among the career education projects in terms of the type and amount of support service activities conducted.

Each of the seven project directors, together with support personnel (e.g. counselors, librarians, media specialists, etc.) was provided a "self-evaluation"

form to be completed each month. The form requested information about the type and amount of effort devoted to (a) general administrative duties, (b) promotional activities (oral and written), (c) instructional materials (purchased or developed), (d) in-service training activities, and (e) counseling services.

Table 3 shows the totals and averages for each item on the form by project. A summary of the findings shown in Table 3 are as follows:

1. The average time devoted to general administrative duties was 249 hours for each project director with a majority of their time devoted to project administration-supervision. The least amount of time was devoted to evaluation and miscellaneous activities. Based on a school year of 180 days (1440 hours), project directors spent about seventeen percent of their time administering the project. Three projects (01, 03, and 05) reported that they devoted about twenty-seven percent (27%) of their time to project administration.
2. During the year, a total of 137 oral presentations about career education were made to various groups of people (average of twenty (20) presentations per project) but mostly to local school board members. While most of the presentations were made to groups of people within the community, it is interesting to note that several of the project directors made oral presentations at state and/or national conventions and to other non-local groups.

Each of the seven career education projects disseminated, on the average, 78 different pieces of written materials (total of 543) to promote career education. Most of the materials were in the form of newsletters, books, pamphlets, or miscellaneous materials. It seems apparent that some projects (03, 05, 07) placed more emphasis on developing promotional materials than did some of the other projects.

3. The seven projects purchased or developed a total of 2053 instructional materials (an average of 293 per project). A majority of the materials were (a) printed materials or aids, or (b) resource guides.
4. A total of 2,443 and an average of 349 individuals per project attended a wide range of in-service training activities. The most frequently used in-service techniques were (a) in-school sessions, (b) extension classes, (c) formal workshops and (d) occupational field trips. It also appears that some projects (03, 04, 05) placed more emphasis on in-service training than did the other four projects.
5. A large number of students received some type of career education counseling services. Most of the students (a) made use of a career education library, (b) attended special guidance activities or (c) received individual or group counseling. While it is apparent that

Table 3

CUMULATIVE SUMMARY OF SUPPORT ACTIVITIES IN CAREER EDUCATION

Activities	Projects							Ave.
	01	02	03	04	05	06	07	
General Administrative Duties (Number of Hours)								
General Project Administration-Supervision	211	36	231	61	153	66	58	117
Securing Information and/or Consultation	89	47	41	33	104	23	25	52
Attend Non-School Career Ed. Meetings	23	36	55	25	50	42	18	35
Project Evaluation	39	29	23	30	45	21	23	30
Other	26	4	52	5	18	0	4	18
Total	388	152	402	154	370	152	128	253
No. of Oral Presentations								
Community and/or Social Groups	1	2	7	2	4	5	0	3
Occupational or Advisory Groups	1	1	1	2	2	5	2	2
Local School and School Board Personnel	26	3	12	2	9	0	1	8
Non-Local Presentations	1	0	1	3	16	2	1	3
Presentations at State or National Conventions	0	1	2	3	0	1	0	1
Other	9	0	1	0	7	0	1	3
Total	38	7	24	12	38	13	5	20
No. of Different Promotional Materials Disseminated								
News Letters	14	0	130	2	7	1	2	22
Project Reports	0	0	2	2	6	1	0	2
Visual Displays	0	0	1	5	4	0	1	2
Booklets or Pamphlets	3	0	0	0	0	1	151	22
Mass Media Releases	3	0	3	3	5	0	1	2
Other	60	0	0	0	110	25	0	28
Total	80	0	136	12	132	28	155	78
No. of Inst. Materials Purchased or Developed								
Printed Instructional Materials-Aids	314	66	5	540	56	0	0	140
Audio-Visual Materials	101	27	36	3	51	8	0	32
Resource Guide or Study	0	21	2	2	501	102	0	90
Books-References	25	50	14	50	13	23	0	25
Evaluation Materials	0	1	0	0	3	23	0	4
Other	0	9	1	0	4	0	0	2
Total	440	174	58	595	630	156	0	293
No. of People Attending In-Service Training Activities								
Formal Workshops	0	0	318	1	5	0	120	63
In-School Training Sessions	4	2	236	95	214	68	18	91
Career Education Extension Classes	106	0	0	0	464	0	0	81
Work Experience Programs	0	0	0	0	20	2	0	3
Occupational Field Trips	237	124	13	0	45	1	8	61
Other	0	0	0	307	33	0	2	49
Total	347	126	567	403	781	71	148	348
No. of Students Involved in Counseling								
Individual Student Counseling	1	560	33	67	1847	0	0	358
Group Counseling	0	173	0	31	2445	0	300	421
Special Guidance Activities (e.g. Career Ed Day)	0	2603	239	0	1918	0	450	744
Career Education Center-Library	425	6713	0	440	951	0	700	1318
Consultation and/or Assistance to Teachers	0	3070	0	60	5	0	0	448
Total	42613119	272	598	7166	0	1450	3289	

counselors in some projects did work with teachers, some projects did not make much use of counselors in their instructional program. Only one of the projects (06) did not report conducting any counseling activities for either students or teachers.

Objective 2:

To determine whether there were differences among the seven career education projects in terms of the type and amount of career education instruction conducted by teachers.

The data presented in Table 4 were obtained via the teacher self-evaluation form. Data are summarized by project and across projects for each of the following: (1) total and average number of instructional activities, (2) percent of activities employing different methods of curriculum organization, (3) total and average amount of instruction, preparation and composite instructional time, and (4) percentage of activities devoted to clusters of career education content. Composite instruction time is the sum of preparation and instruction time.

1. A total of 10,026 career education instructional activities were reported by the teachers in the seven projects. On the average, each teacher conducted twenty-one (21) different instructional activities related to career education during the year. It appears that, on the average, the teachers in the three projects (03, 04, and 05) conducted more activities than teachers in the other projects.
2. Of the total number of activities conducted (10,026), sixty-four percent (64%) of them were integrated with the regular course content and about eighteen percent (18%) were taught either as separate units or classes, respectively. While some of the projects differed in the way in which the activities were placed in the curriculum, more than fifty percent of the activities conducted in each project were integrated with the regular course content.
3. Teachers reported to have spent a total of 17,606 hours conducting and preparing for career education instruction. About sixty-five percent (65%) of the time was for actual classroom instruction and the remaining time (35%) was used for preparation. On the average, each of the 498 teachers who participated in the process evaluation spent about 35 hours over a seven month period of time on career education instruction activities. This amounts to an average of about five hours per month or about 1.25 hours per week. Based on a full 180 days of school (1440 hours) each teacher spent a little more than two percent (2.43%) of the school year preparing for and/or conducting career education activities. There was, however, considerable differences among projects in terms of the average amount of time teachers devoted to career education instruction. The averages range from a high of 46 hours a year (project 05) to a low of 18 hours a year (project 06).

Table 4

A COMPARISON OF SEVEN CAREER EDUCATION PROJECTS IN TERMS OF THE RELATIVE AMOUNT
OF EFFORT DEVOTED TO CAREER EDUCATION INSTRUCTIONAL ACTIVITIES

Activity		Projects							Totals N=498
		01 N=33	02 N=23	03 N=113	04 N=44	05 N=189	06 N=57	07 N=39	
Total and Average Numbers of Instructional Activities per Teacher per Year		397 $\bar{X}=12$	235 $\bar{X}=10$	3046 $\bar{X}=27$	900 $\bar{X}=20$	4075 $\bar{X}=22$	662 $\bar{X}=12$	711 $\bar{X}=18$	10,026 $\bar{X}=21$
Curriculum Organization	Separate Units	N 62 % 16%	N 39 % 17%	N 465 % 15%	N 180 % 20%	N 891 % 22%	N 108 % 16%	N 102 % 14%	1847 18%
	Separate Classes	N 48 % 12%	N 47 % 20%	N 509 % 17%	N 101 % 11%	N 862 % 21%	N 96 % 15%	N 106 % 15%	1769 18%
	Integrated with Content	N 287 % 72%	N 149 % 63%	N 2072 % 68%	N 619 % 69%	N 2322 % 57%	N 458 % 69%	N 503 % 71%	6410 64%
	Total	N 397 % 100%	N 235 % 100%	N 3046 % 100%	N 900 % 100%	N 4075 % 100%	N 662 % 100%	N 711 % 100%	10,026 100%
Total and Average Hours of Composite Instruction Time per Teacher per Year		1022 $\bar{X}=31$	736 $\bar{X}=32$	3881 $\bar{X}=34$	1566 $\bar{X}=36$	8595 $\bar{X}=46$	1056 $\bar{X}=19$	751 $\bar{X}=19$	17,606 $\bar{X}=35$
Total and Average Hours of Instruction Time per Teacher per Year		591 $\bar{X}=18$	494 $\bar{X}=21$	2482 $\bar{X}=22$	893 $\bar{X}=20$	5419 $\bar{X}=29$	688 $\bar{X}=12$	483 $\bar{X}=12$	11,050 $\bar{X}=22$
Total and Average Hours of Preparation Time per Teacher per Year		431 $\bar{X}=13$	242 $\bar{X}=11$	1399 $\bar{X}=12$	673 $\bar{X}=15$	3176 $\bar{X}=17$	368 $\bar{X}=6$	268 $\bar{X}=7$	6557 $\bar{X}=13$
Distribution of Effort per Content Area	Self Awareness	N 614 % 20%	N 515 % 21%	N 4921 % 17%	N 1604 % 18%	N 6706 % 17%	N 868 % 19%	N 1144 % 16%	16,372 18%
	Work Roles: General	N 409 % 13%	N 332 % 14%	N 4017 % 14%	N 1168 % 13%	N 5194 % 14%	N 738 % 16%	N 941 % 13%	12,799 14%
	Work Roles: Requirements	N 406 % 13%	N 349 % 14%	N 3393 % 12%	N 1091 % 12%	N 4908 % 13%	N 523 % 12%	N 947 % 13%	11,617 13%
	Work Roles: Workers	N 325 % 11%	N 291 % 12%	N 2639 % 9%	N 733 % 8%	N 3719 % 10%	N 441 % 10%	N 734 % 10%	8882 10%
	Planning Process	N 361 % 12%	N 276 % 11%	N 3000 % 10%	N 934 % 10%	N 4518 % 12%	N 394 % 9%	N 828 % 11%	10,311 11%
	Occupational Levels	N 459 % 15%	N 231 % 10%	N 3795 % 13%	N 1284 % 14%	N 4778 % 12%	N 559 % 12%	N 892 % 12%	11,998 13%
	Occupational Industries	N 534 % 17%	N 436 % 18%	N 7090 % 25%	N 2346 % 26%	N 8731 % 23%	N 980 % 22%	N 1808 % 25%	21,925 24%
	Total	N 3108 % 100%	N 2430 % 100%	N 28855 % 100%	N 9160 % 100%	N 38554 % 100%	N 4503 % 100%	N 7294 % 100%	93,904 100%

The results were about the same in terms of the average amount of time teachers devoted to either career education instruction or preparation. Teachers in project 05 had the highest yearly average and teachers in project 06 had the lowest yearly average.

4. The two areas of content that received the greatest emphasis were (a) occupational industries and (b) self awareness. The content areas which received the least emphasis were (a) workers and (b) career planning process. While there were some differences in the relative emphasis of certain content areas, the general distribution among content areas was about the same for all of the projects. It therefore seems safe to conclude that while the exact content for each instructional activity may have differed greatly among teachers, and that the projects may have emphasized different instructional techniques, the general content emphasis (objectives) was very similar for each of the projects.

Objective 3:

To determine whether there were differences among the seven career education projects in terms of the instructional methods used by teachers to implement career education.

Information regarding the use of various instruction methods was obtained via teacher response to the self-evaluation form. Table 5 presents the data in terms of frequencies (N), percents and rank orders of instructional methods used for each project separately and for the seven projects collectively.

A total of 10,026 activities were conducted by the teachers in the seven projects during a seven month period. The instructional methods used most frequently were ranked as follows: (1) audio visual, (2) presentation-discussion, (3) class projects, (4) workers in class, (5) role playing, (6) field trips, and (7) counseling and guidance. The least frequently used methods were: (13) inter-class projects, (12) work observation, (11) use of information center, (10) simulated work experience, (9) career games, and (8) work experience.

A comparison of the projects in terms of the rank order of instructional methods used, shows some obvious differences in the way in which each project implemented career education. The greatest differences that were detected among projects occurred in the use of: (a) field trips, (b) work observation, (c) work experience, (d) career games, (e) class projects, (f) counseling and guidance, and (g) use of information center. It, therefore, seems safe to conclude that while projects made use of different combinations of methods to implement career education, they also used instructional techniques that were quite common to each other.

Table 6 shows the total and average amount of time devoted to each method of instruction for the seven projects separately and collectively. Teachers spent a total of about 17,606 hours either preparing for or teaching career education. On the average, each teacher spent about 35.4 hours of time on career education during the year with each activity taking on the average of 2.0 hours of composite instruction time.

Table 5

A COMPARISON OF SEVEN CAREER EDUCATION PROJECTS IN TERMS OF THE FREQUENCY,
PERCENT AND RANK ORDER OF INSTRUCTIONAL METHODS

Method of Instruction	01			02			03			Projects 04			05			06			07			Total N=498		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	R	N	%	R	N	%	Rank	N	%	Rank
Field Trip	31	8	5.0	25	11	4.0	174	6	6.0	50	6	8.0	169	4	8	25	4	8	66	9	3.0	540	5	6
Workers in Class	27	7	6.5	21	9	5.5	298	10	4.0	82	9	4.0	264	6	5	53	8	4	61	9	4.0	806	8	4
Work Observation	15	4	8.5	5	2	13.0	74	2	10.0	22	2	11.5	125	3	11	42	6	5	51	7	6.0	334	3	12
Work Experience	13	3	10.0	17	7	8.0	88	3	8.5	47	5	9.0	237	6	6	8	1	12	16	2	9.0	426	4	8
Audio Visual	42	11	3.0	26	11	3.0	900	30	1.0	155	17	2.0	802	20	2	132	20	2	194	27	1.0	2251	23	1
Role Playing	15	4	8.5	13	6	9.0	195	6	5.0	72	8	5.0	185	5	7	34	5	6	37	5	7.0	551	5	5
Career Games	9	2	11.5	7	3	11.0	161	5	7.0	52	6	7.0	120	3	12	31	5	7	15	2	10.0	395	4	9
Presentation Discussions	84	21	1.0	32	14	2.0	570	19	2.0	163	18	1.0	1005	25	1	164	25	1	158	22	2.0	2176	22	2
Projects in Class	83	21	2.0	34	14	1.0	339	11	3.0	121	14	3.0	470	12	3	102	16	3	54	8	5.0	1203	12	3
Inter-Class Projects	8	2	13.0	6	3	12.0	51	2	12.0	9	1	13.0	61	1	13	14	2	11	10	1	13.0	159	2	13
Simulated Work Experience	33	8	4.0	21	9	5.5	65	2	11.0	29	3	10.0	159	4	9	24	4	9	13	2	11.5	344	3	10
Counseling-Guidance	27	7	6.5	20	9	7.0	41	1	13.0	22	2	11.5	343	8	4	17	3	10	13	2	11.5	483	5	7
Use of Information Center	9	2	11.5	8	3	10.0	88	3	8.5	66	7	6.0	135	3	10	11	2	12	23	3	8.0	340	3	11
Total	396	100		235	100		3044	100		890	100		4075	100		657	100		711	100		10008	100	

Table 6

A COMPARISON OF SEVEN CAREER EDUCATION PROJECTS IN TERMS OF THE TOTAL AND AVERAGE COMPOSITE TIME (HOURS) DEVOTED TO EACH OF THIRTEEN DIFFERENT INSTRUCTIONAL METHODS

Method of Instruction	Project														Total N=498	
	01		02		03		04		05		06		07			
	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time	Total Time	Ave. Time
Field Trip	112	3.6	96	3.8	462	2.7	110	2.2	521	3.1	70	2.8	131	2.0	1502	2.8
Workers in Class	60	2.2	58	2.8	372	1.2	206	2.5	525	2.0	78	1.5	66	1.1	1365	1.7
Work Observation	35	2.3	12	2.4	109	1.5	36	1.6	223	1.8	46	1.1	37	.7	498	1.5
Work Experience	42	3.2	42	2.5	145	1.6	123	2.6	767	3.2	16	2.0	17	1.1	1152	2.7
Audio Visual	78	1.9	57	2.2	826	.9	193	1.2	972	1.2	153	1.2	167	.9	2446	1.0
Role Playing	46	3.1	24	1.9	294	1.5	111	1.5	360	1.9	51	1.5	43	1.2	929	1.7
Career Games	19	2.1	23	3.3	178	1.1	58	1.1	222	1.8	51	1.6	13	.9	564	1.4
Presentation Discussions	175	2.1	101	3.2	605	1.1	231	1.4	1357	1.3	225	1.4	128	.8	2822	1.3
Projects in Class	219	2.6	108	3.2	504	1.5	337	2.8	1340	2.9	227	2.2	78	1.4	2813	2.3
Inter-Class Projects	21	2.6	30	5.0	75	1.5	7	.8	162	2.7	26	1.9	8	.8	329	2.1
Simulated Work Experience	128	3.9	130	6.2	155	2.4	65	2.2	585	3.7	71	3.0	20	1.5	1154	3.4
Counseling-Guidance	70	2.6	36	1.8	42	1.0	39	1.8	1298	3.8	27	1.6	12	.9	1524	3.2
Use of Information Center	17	1.9	19	2.4	112	1.3	50	.8	264	2.0	15	1.3	31	1.4	508	1.5
Total	1022	2.6	736	3.1	3879	1.5	1566	1.7	8596	2.4	1056	1.8	751	1.1	17606	2.0

It seems apparent that teachers made use of a wide range of instructional techniques, however, a greater amount of time was devoted to the use of visual aids, presentation-discussions and class projects than some of the other instructional methods. Audio-visual and presentation-discussion, on the average, required the least amount of time per activity (1.1 hours and 1.3 hours respectively). Activities which, on the average, seem to require the most time were: (a) simulated work experience (3.3 hours), (b) field trips (2.8 hours) and (c) work experience (2.7 hours). In general, it seems that activities which make use of facilities outside of the classroom or try to simulate actual work experiences require considerably more time than activities which typically can be taught in the regular classroom.

Projects seemed to differ with respect to the average amount of time they devoted to the various instructional methods. Table 7 shows the range in the average amount of time consumed by each method of instruction.

Table 7
RANGE IN AVERAGE AMOUNT OF TIME (HOURS) CONSUMED
BY EACH OF THIRTEEN INSTRUCTIONAL METHODS

	High	Range	Low
Field Trip	3.8		2.0
Workers in Class	2.8		1.0
Work Observation	2.5		.7
Work Experience	3.3		1.1
Audio Visual	2.2		.9
Role Playing	3.1		1.2
Career Games	3.4		.9
Presentation-Discussion	3.0		.8
Projects in Class	3.2		1.4
Inter-Class Projects	5.1		.8
Simulated Work Experience	6.0		1.6
Counseling and Guidance	3.8		.9
Use of Information Center	2.4		.8

This information suggests that one of the differences that may exist among projects is the relative amount of time which is devoted to each activity. This does not suggest that the quality of instruction in the projects were not equal, but only that the distribution of time per instructional method was different.

LIMITATIONS, SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Limitations

The data contained in this report were based on monthly self-evaluations completed by both teachers and directors for a seven month period. Because the information was collected at only one point in time, no attempt was made to empirically determine the exact validity or reliability of the data. However, an attempt was made through a survey of teachers to obtain a gross estimate of the reliability and validity of the data obtained by the specially designed optical scan form.

There may be some doubt about the validity and reliability of the data provided by teachers. The percent of errors teachers made in completing the self-evaluation form each month ranged from a high of seventy-three percent (73%) for the first reporting period to a low of eleven percent (11%) in the last reporting period. It seems likely that teachers had difficulty completing the form either because (a) the form or directions were not clear or (b) teachers were not accustomed to completing an optical scan evaluation form. Based on a survey of teachers who participated in the evaluation, it seemed apparent that most teachers waited until the end of the month to complete the form rather than completing it on a daily basis as directed. Completing the form in retrospect at the end of the month may tend to produce a certain amount of unreliability. On the other hand, a majority of the teachers reported that they felt (a) the directions on the form were quite clear, (b) the form was quite comprehensive and easy to follow, and (c) they accurately reported all of the instructional activities they conducted even though most forms were not completed until the end of the month.

Summary and Conclusions

The state of Minnesota utilized its share of federal funding to assist eight different school districts to implement career education. Each of the projects proposed uniquely different ways for implementing career education. Because so little was known about the most effective or efficient way(s) to implement career education, the Minnesota RCU was contracted to develop and operate a comprehensive system of evaluation in order to obtain the necessary empirical information for making decisions about improving the quality and quantity of activities in each of the developmental projects. This report contains a description of the formative evaluation (process evaluation) used

by teachers and directors to implement career education. Because of a change in projects, only seven of the eight projects participated in the evaluation during the 1972-73 school year. The study was primarily concerned with determining whether there were differences among the projects in terms of the amount, type and distribution of effort in career education that was devoted to (a) support activities, (b) instructional methods and (c) instructional content.

Data were obtained from project directors, selected support personnel and from teachers for a seven month period using two specially designed self-evaluation forms. Directors and support personnel completed a self-evaluation form which described the type and amount of effort devoted to support activities each month. Teachers described the type of instructional methods and amount of time they devoted to career education by completing a form designed to be read by optical scanning equipment. Teachers were asked to "describe" each activity related to career education by "darkening" the appropriate circles on the form. The form provided teachers the opportunity to describe twenty (20) separate activities each month in terms of (a) methods of instruction, (b) curriculum organization, (c) success of the activity to interest and motivate students, (d) amount of preparation and instruction time devoted to each activity, (e) number of students served and (f) content emphasis.

Teachers and directors began completing the forms in October 1972. Each month directors received a cumulative summary of the support activities in their project. Teachers were provided with computer printouts of their career education instructional activities five times during the year.

The formative evaluation design called for a continuous system of data analysis and feedback such that immediate modifications could be made in each project on a monthly basis. A total of about 3500 self-evaluation forms were processed for about 500 participating teachers. There seems to be little doubt that the optical scan form used by teachers represents an efficient way to obtain and analyze large quantities of data. The relative cost of collecting the data from teachers using the optical scan form was about \$1.58 per teacher in contrast to the cost of collecting the same data by more conventional means and then having it keypunched. The latter method would have averaged about \$19.00 per teacher.

The conclusions concerning the type and amount of support activities provided are as follows:

1. Project directors reported to have engaged in a wide range of support activities to include (a) project administration and supervision, (b) promotional activities (written and oral), (c) curriculum development, (d) in-service training and (e) guidance and counseling services to students and staff.
2. Project directors devoted, on the average, about seventeen percent (17%) of their work load to the career education project with most of the time spent on project administration and supervision.
3. Projects did differ in terms of the amount of emphasis devoted

to (a) promotional activities, (b) in-service training, (c) curriculum development and (d) counseling services.

Based on the information provided by teachers using the specially designed self-evaluation forms, the following conclusions seem warranted:

1. Each teacher who participated in the evaluation process conducted, on the average, twenty-one (21) activities related to career education during a seven month period which consumed (on the average) about thirty-five (35) hours of preparation and instruction time. This means that each teacher spent about five hours a month or about one and one-quarter (1.25) hours per week on instructional activities related to career education. While projects tended to differ in terms of the average number of activities conducted and the average number of hours teachers devoted to career education, these differences were not large.
2. A majority of the activities conducted by teachers were integrated with the regular course content; proportionally fewer activities were taught as separate classes or units. Projects did not differ substantially in terms of the way career education activities were implemented into the curriculum.
3. Teachers tended to place emphasis on different content areas (objectives). A majority of the instructional emphasis was placed on (a) self awareness concepts, and (b) industries. Proportionately less emphasis was placed on (a) career planning processes, (b) work role requirements and workers and (c) occupational levels. Although there were some differences among projects in terms of content emphasis, the general distribution of effort across content areas was quite similar.
4. Teachers conducted a total of 10,026 career education activities which consumed about 17,606 hours of instruction and preparation time. These activities were distributed somewhat disproportionately among thirteen types of instructional methods. The most frequently used methods were: (a) audio-visual presentations, (b) presentation and discussion, (c) class projects, and (d) workers in class. The least frequently used methods were: (a) inter-class projects, (b) work observation, (c) use of information center, (d) career games, and (e) work experience. The general conclusion suggests that teachers preferred instructional methods which could be conducted within the classroom.
5. Projects did differ in terms of the relative use of various instructional methods. Major differences occurred in the use of about seven instructional methods: (1) field trips, (2) work observation, (3) work experience, (4) career games, (5) class projects, (6) counseling and (7) use of information center. This conclusion supports the contention that projects did, in fact, differ with respect to the manner in which career education was implemented.

6. Certain instructional methods tended to consume more instructional time than other methods. On the average, the methods which consumed the most time were those which dealt with or attempted to simulate work experiences outside of the classroom (e.g. field trips, simulated work experiences, work experience). The methods which consumed the least amount of time were those which could most easily be taught in the classroom (e.g. audio-visual presentations, presentation-discussions, career games, etc.)
7. Projects differed considerably in terms of the average amount of time devoted to each of the instructional methods. It appears that projects may have had different strategies for implementing career education. Some teachers appeared to have conducted fewer activities but spent more time per activity while others appeared to have conducted more activities but spent less time on each activity.

Recommendations

The findings suggest that two types of recommendations be made in the project in subsequent years. First, it seems apparent that the instruments needed to describe the "processes" used to implement career education be modified and improved. Second, that directors and teachers be encouraged to spend a greater proportion of their time towards implementing career education.

Self-Evaluation Instrument: Of the two self-evaluation instruments used, only the optical scan form for teachers appears to need improvement. Suggested areas of improvement are as follows:

1. Provide space to code the number of forms submitted each month and eliminate the code dealing with "number of students".
2. Revise and clarify directions with emphasis on completing the form on a daily basis.
3. Eliminate separate grade designations and create clusters of grades (e.g. K-3, 4-6, 7-9, 10-12).
4. Modify existing and add different types of instructional methods to the form.
5. Number each of the major categories on the form to insure that teachers place a "mark" in each category.
6. Add a row of optical scan circles for teachers to indicate (a) no preparation time was needed and (b) that more than 100 students were involved in an instructional activity.

7. Shade alternate columns on the form so it will be easier for teachers to follow the correct column down the form.

Program Implementation: It is generally accepted that the amount students learn in a subject is directly related to the amount of time a teacher devotes to that subject. If this assumption is correct, the more emphasis that is placed on career education, the greater the impact is likely to be on students.

Project directors devoted about seventeen percent (17%) of their time administering and supervising the career education projects and teachers spent slightly less than three percent of their total school year teaching concepts related to career education. While the appropriate amount of time that should be devoted to career education has not been specified, it would seem that teachers are likely to have to devote more time to it if the intent is to make an impact on students. It therefore seems plausible that both teachers and directors in the exemplary projects reassess the distribution of their responsibilities for career education and establish some guidelines for the amount of time that should be devoted to career education.

APPENDICES

- Appendix A: Biographical Data Sheet for Teachers
- Appendix B: Summary of Support Activities in Career Education:
Directors Form
- Appendix C: Teachers Self-Evaluation of Career Education
Instructional Activities
- Appendix D: Sample Computer Output for Teacher Self-Evaluation
Form
- Appendix E: Effectiveness and Efficiency of Data and Process
Evaluation System

APPENDIX A

Biographical Data Concerning the Career Education

Teachers of Exemplary Projects

Check or write in appropriate answers.

Identification Codes: _____

Project

School

Teacher Code

1. Number of years of teaching experience (including this year): ____
2. Number of years of full-time non-school work experience in business and industry (including military): ____
3. Amount of in-service career education training:
 - A. Number of organized field trips to business and industry for career orientation: ____
 - B. Number of credits from college classes in career education: ____
 - C. Number of hours spent in formal career education workshops: ____
 - D. Number of hours spent in career education staff meetings: ____
4. Were you involved in organized curriculum development activities for the career education project? Yes ____ No ____ . If yes, how many hours did you spend in this activity? ____
5. Which of the following locations best describes your residence before teaching? Rural ____ Small town ____ Urban ____ Suburban ____
6. What was your primary curriculum emphasis in high school?
General Preparation ____ College Preparation ____ Vocational Preparation ____

Date of high school graduation: ____

7. What is your current degree status and major field?

Bachelors	____	Major	_____
Bachelors plus	____	Major	_____
Masters	____	Major	_____
Masters plus	____	Major	_____
Doctorate	____	Major	_____

8. How many years have you been directly involved in the career education project (including this year)? ____
9. How many years have you included the planned study of career education in your classes? ____

IDENTIFICATION CODE

Project		School		Teacher		
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

Grade Level	Number of Students	Month
K	0	☐ July
1	1	☐ August
2	2	☐ Sept.
3	3	☐ Oct.
4	4	☐ Nov.
5	5	☐ Dec.
6	6	☐ Jan.
7	7	☐ Feb.
8	8	☐ Mar.
9	9	☐ Apr.
10	10	☐ May
11	11	☐ June
12	12	
☐ Ungraded		

CURRICULUM AREA
☐ UNGRADED ELEMENTARY
☐ REGULAR ELEMENTARY
☐ SECONDARY SCHOOL SUBJECTS
☐ Language
☐ Math
☐ Science
☐ Social Studies
☐ Health
☐ Physical Education
☐ Fine Arts
☐ Practical Arts
☐ Vocational
☐ Other

APPENDIX B TEACHER'S SELF EVALUATION OF CAREER EDUCATION INSTRUCTIONAL ACTIVITIES

Directions: The following six steps have been proposed to assist you in providing information about the instructional activities in your class that relate to career education and to insure that your responses will be read accurately by the optical scanning device.

Step 1: Follow the simple rules for making responses on the form:

- Use only a Number 2 or softer black lead pencil
- Make heavy black marks that fill the circle *completely*
- Erase cleanly any answer you wish to change
- Make no stray marks on the paper
- Do not make additional folds in the form
- Example: Will marks made with a ball point pen be properly read? ☐ Yes ☒ No

Step 2: Using the code numbers which appear on the front of your booklet, fill in the coding blocks by darkening the appropriate circles. In addition, indicate the (a) grade level you teach, (b) total number of students for whom you are responsible, (c) month of the year you completed the form and (d) curriculum area for which you are responsible.

Step 3: Open the form and become familiar with the information you are to use to describe *each* instructional activity that is related to career education. As soon as you complete an instructional activity, complete the form by darkening in *one* circle in the appropriate space for each category. Each form allows you to describe twenty (20) different instructional activities. Use as many forms as are necessary to describe all of the career education activities in which you engaged this month.

Step 4: Indicate the number of minutes it took you to describe *each* instructional activity by darkening the appropriate circle.

Step 5: Review the form to make sure it is complete and properly filled out and then see to it that it gets to your director by the last day of each calendar month. NOTE: Do not make additional folds in the form.

Step 6: Repeat Steps 1-5 to describe the instructional activities for each calendar month.

This instrument was developed by Roy Thomas with technical consultation from Brandon B. Smith from the Minnesota RCU and the Vocational-Technical Division of the Minnesota State Department of Education for use with exemplary career education projects.

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MARK ONE IN EACH CATEGORY

Number of people or students involved: _____

Form Completion Time: Under 3 minutes
3-6 minutes
over 6 minutes

APPENDIX C

Summary of Support Activities in Career Education for the month of _____ (Directors Form)

Name of Director _____ Project Name _____

Project Code Number _____ Date Reported _____

Directions: The purpose of this log sheet is to obtain information from the director about his activities and the activities of support staff which contribute directly to the success of the career education project. At the end of each week the director is encouraged to complete this form by (a) looking in retrospect at his activities and (b) obtaining relevant information about the activities of other support personnel.

		<u>Number of Hours</u>			
General Administration	Duties				
	General Project Administration-Supervision	_____			
	Securing Information and/or Consultation	_____			
	Attend Non-School Career Education Meetings or Conferences	_____			
	Project Evaluation	_____			
	Other (Specify) _____	_____			
Promotional Activities Related to Career Education	Oral Presentations	Community and/or Social Groups	<u>Number of Presentations</u>	<u>Total Amount of Time (Hrs)</u>	<u>No. of People Attending</u>
		Occupational or Advisory Groups	_____	_____	_____
		Local School and School Board Personnel	_____	_____	_____
		Non-Local Presentations	_____	_____	_____
		Presentations at State or National Conventions	_____	_____	_____
		Other (Specify) _____	_____	_____	_____
	Printed Materials	<u>Number Produced</u>	<u>Number Disseminated</u>	<u>Developmental Time (Hrs)</u>	
		News Letters	_____	_____	_____
		Project Reports	_____	_____	_____
		Visual Displays	_____	_____	_____
Booklets or Pamphlets		_____	_____	_____	
	Mass Media Releases	_____	_____	_____	
	Other (Specify) _____	_____	_____	_____	
Career Education Materials		<u>No. of Different Material Purchased</u>	<u>Developed</u>	<u>Man Hours of Developmental Time</u>	
	Printed Instructional Materials-Aids	_____	_____	_____	
	Audio Visual Materials	_____	_____	_____	
	Resource Guide or Study	_____	_____	_____	
	Books-References	_____	_____	_____	
	Evaluation Materials	_____	_____	_____	
	Other (Specify) _____	_____	_____	_____	
In-Service Career Education		<u>No. of People Attending</u>	<u>Total Hours Per Week</u>	<u>Total Man Hours/Week</u>	
	Formal Workshops	_____	_____	_____	
	In-School Training Sessions	_____	_____	_____	
	Career Education Extension Classes	_____	_____	_____	
	Work Experience Programs	_____	_____	_____	
	Occupational Field Trips	_____	_____	_____	
	Other (Specify) _____	_____	_____	_____	
Counseling and Guidance		<u>No. of Students Participating</u>	<u>No. of Teachers Participating</u>		
	Individual Student Counseling	_____	_____		
	Group Counseling	_____	_____		
	Special Guidance Activities (e.g. Career Education Days)	_____	_____		
	Career Education Center-Library	_____	_____		
	Consultation and/or Assistance to Teachers	_____	_____		

Form Completion Time: _____

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SUMMARY OF INSTRUCTIONAL ACTIVITIES IN CAREER EDUCATION -- MINNESOTA RCU, BRANDON B. SMITH, PROJECT DIRECTOR
PROJECTO RED WING (5)

METHODS	FREQUENCY	TOTAL	TOTAL	AVERAGE	COMPOSITE	PERCENTAGE DISTR.		
		INSTRUCTIONAL TIME	PREPARATION TIME	NO. OF STUDENTS	INSTRUCTOR TIME	EXCL.	GOOD	POOR
FIELD TRIP	91	240.7 HRS.	134.0 HRS.	35.8	374.7 HRS.	78.0	20.9	1.1
WORKERS IN CLASS	199	248.7 HRS.	153.5 HRS.	48.2	402.2 HRS.	66.8	32.2	1.0
WORK OBSERVATION-INTERVIEW	101	102.8 HRS.	69.8 HRS.	37.4	172.7 HRS.	55.4	41.6	3.0
WORK EXPERIENCE	163	371.2 HRS.	164.2 HRS.	28.9	535.3 HRS.	38.0	60.1	1.8
AUDIO-VISUAL	574	446.7 HRS.	253.7 HRS.	40.6	700.3 HRS.	51.0	46.7	2.3
ROLE PLAYING (PLAYS, SKITS)	138	165.2 HRS.	111.5 HRS.	45.5	276.7 HRS.	55.8	41.3	2.9
CAREER GAMES	72	50.5 HRS.	63.8 HRS.	41.2	114.3 HRS.	61.1	37.5	1.4
PRESENTATION-DISCUSSION	754	652.0 HRS.	416.0 HRS.	41.4	1068.0 HRS.	37.3	60.7	2.0
PROJECTS IN CLASS	324	659.3 HRS.	340.7 HRS.	49.2	1000.0 HRS.	52.8	45.4	1.9
INTER-CLASS PROJECTS	43	67.5 HRS.	53.3 HRS.	45.7	120.8 HRS.	58.1	41.9	0.0
SIMULATED WORK EXPERIENCE	127	275.5 HRS.	169.3 HRS.	48.5	444.8 HRS.	53.5	44.1	2.4
COUNSELING AND GUIDANCE	265	605.5 HRS.	350.7 HRS.	35.4	956.2 HRS.	48.7	49.1	2.3
USE OF INFORMATION CENTER	108	123.7 HRS.	85.3 HRS.	46.2	209.0 HRS.	42.6	51.9	5.6
TOTALS	2959	4009.2 HRS.	2365.8 HRS.	41.7	6375.0 HRS.	49.2	48.7	2.1
CURRICULUM ORGANIZATION								
SEPARATE UNITS	649	1108.0 HRS.	645.8 HRS.	36.1	1753.8 HRS.	58.6	39.8	1.7
SEPARATE CLASSES	597	851.3 HRS.	452.5 HRS.	39.5	1303.8 HRS.	47.2	50.6	2.2
INTEGRATED WITH COURSE CONTENT	1703	2035.7 HRS.	1264.0 HRS.	44.8	3299.7 HRS.	46.4	51.6	2.1
TOTALS	2949	3995.0 HRS.	2362.3 HRS.	41.8	6357.3 HRS.	49.2	48.8	2.0

FREQUENCIES OF RESPONSE TO CAREER EDUCATION OBJECTIVES AND CONTENTO

FREQ.-SELF AWARENESS

989 -MENTAL-PHYSICAL ABILITIES
778 -SCHOOL AND WORK ABILITIES
1096 -PERSONALITY, ATTITUDES
941 -EDUCATIONAL NEEDS, GOALS
1312 -OCCUPATIONAL NEEDS, GOALS
FREQ.-WORK ROLES, GENERAL
1223 -IMPORTANCE OF WORK
529 -SOCIO-ECONOMIC IMPACT
483 -CHANGE IN WORK ROLES
1591 -KINDS OF CAREERS
FREQ.-WORK ROLES, REQUIREMENTS
1115 -ABILITY REQUIREMENTS
895 -EDUCATIONAL REQUIREMENTS
1085 -WORKING CONDITIONS
551 -EMPLOYMENT POLICY AND DEMANDS

FREQ.-WORK ROLES, WORKERS

918 -MENTAL-PHYSICAL ABILITIES
1072 -NEEDS AND SATISFACTION
829 -EDUCATIONAL NEEDS, GOALS
FREQ.-PLANNING PROCESS
567 -RELAT. WORK TO NON-WORK ROLES
698 -NEED FOR CAREER PLANNING
310 -PROCESSES OF CAREER PLANNING
439 -LOCATING AND USING INFORMATION
881 -CAREER AND EDUCATION OPPORTUN.
472 -EDUCATIONAL ROLE IN PLANNING
FREQ.-OCCUPATIONAL LEVEL(S)
900 -PROFESSIONAL AND TECHNICAL
334 -MANAGERS AND OWNERS
448 -CLERICAL
581 -SALES AND SERVICE
523 -CRAFTSMEN
599 -OPERATIVES AND LABORERS

FREQ.-OCCUPATIONAL AREA

404 -CONSTRUCTION
501 -MANUFACTURING
450 -NATURAL RESOURCES
416 -TRANSPORTATION
486 -MARKETING AND ADVERTISING
566 -COMMUNICATIONS
280 -GOVERNMENT AND FINANCE
336 -PUBLIC UTILITIES
512 -EDUCATION AND RESEARCH
514 -HEALTH AND WELFARE
401 -RECREATION
454 -ARTS AND ENTERTAINMENT
553 -PERSONAL SERVICES
387 -CONSUMER AND HOMEMAKING

FORM COMPLETION TIMEO

FREQ. RESPONSE CATEGORY

1315 UNDER 3 MINS.
1105 3 TO 6 MINS.
549 OVER 6 MINS.

APPENDIX E

EFFECTIVENESS AND EFFICIENCY OF DATA

AND PROCESS EVALUATION SYSTEM

Scoring Self-Evaluation Forms

The self-evaluation booklets were distributed to teachers by the project directors on September 15, 1972. Since project directors or their designate would provide the in-service training to teachers, each director attended a training session which described the procedures for completing the form. Teachers began completing the forms during the month of October. In some instances forms were not completed until November because of delayed in-service training sessions.

Table 8 shows the number of teachers who submitted forms for each of the seven months data were collected and the number of forms that had to be corrected and re-scored. It should be noted, however, that each form rejected by the computer had already been edited by both the project director and a member of the RCU staff.

Table 8

NUMBER OF TEACHER SELF-EVALUATION FORMS SCORED AND RE-SCORED
DURING THE 1972-73 ACADEMIC SCHOOL YEAR
(TOTALS FOR SEVEN CAREER EDUCATION PROJECTS)

Month	Initial # Scored	Number Re-Scored	Error Rate
October	467	339	73%
November	543	116	21%
December	457	62	14%
January	440	66	15%
February	477	65	14%
March	475	51	11%
April	365	45	12%
Total	3,224	744	23%

Table 8 indicates that a total of 3,224 forms were scored for the 498 participating teachers. During the seven month period, 744 forms had to be re-scored at least once. This indicates that there was, on the average, about a twenty-three percent error rate in scoring the forms. The highest error rate was seventy-three percent (73%) for the month of October and gradually improved to a low of eleven percent (11%) in March. It should be noted, however, that each form was subjected to a very critical edit by the computer. That is, if only one circle or section of the form was not filled in correctly, the entire form was rejected and had to be re-scored. Consequently, while the percentage of forms re-scored was rather high, the actual number of significant errors were probably much lower. Records of the number of errors made per form were not kept.

The findings suggest that increased use of and familiarity with the instrument tends to substantially reduce the number of errors made by teachers. Additional modifications in the form and more in-service training may even further reduce the number of errors and thus increase the effectiveness of the instrument for collecting this type of data.

The efficiency of this data collection process can be judged in terms of the cost per teacher as compared with other methods of data collection. The cost of printing the instrument was about \$1.16 per teacher. The average cost for scoring (and re-scoring) the forms was \$.42 per teacher (over the seven month period - \$.06 per form). Thus the total cost for collecting seven months of data from each teacher was approximately \$1.58.

To collect and keypunch the same data, using a more standard data collection procedure would have cost about \$11,000. The average cost per teacher would have been \$19.30 for the seven month period. That is, it would have taken twenty-six computer cards per month per teacher to record the same data collected via the optical scan form. A total of 90,636 cards would have been required for the 498 teachers during the seven month period. The cost of keypunching alone would have been nearly \$10,375. Thus, by using the optical scan instrument, there is a net savings of \$17.72 per teacher with a total savings of nearly \$8,825.00. consequently, although the instrument had shortcomings in terms of its effectiveness (accuracy), it appeared to represent a very efficient way to collect and score large quantities of data.

In order to further assess the effectiveness of the evaluation system a questionnaire was distributed to each of the 498 participating teachers in May of 1973. The questionnaire was designed to determine the relative reliability and validity of the data collected and assess the general utility of the evaluation system. The questionnaire consisted of thirteen (13) items. The first two referred to when the self-evaluation forms were filled out (daily, weekly, or monthly) by each teacher and how accurately the teachers were able to describe the instructional activities in which they engaged. Items numbered 3 through 10 were concerned with the clarity of instructions and ease in completing the self-evaluation forms. Items 11 and 12 were related to the general validity of the instrument; and the final question provided the opportunity for teachers to give their personal opinions about the self-evaluation form and informational feedback system.

The population of teachers who received the questionnaire included all teachers who had been involved in the exemplary career education projects during the 1972-73 school year. The number of teachers participating within each district at each school level is shown in Table 9. A total of 498 questionnaires were sent to individual teachers; 283 were returned to the RCU for analysis. This represents a return rate of fifty-seven percent (57%).

Table 9
SUMMARY OF RETURNS FOR TEACHER EVALUATION QUESTIONNAIRE

PROJECT	Elementary		Junior High		Senior High		Totals		
	Number Sent	Number Returned	Number Sent	Number Returned	Number Sent	Number Returned	Number Sent	Number Returned	Percent Returned
01	8	0	13	8	12	5	33	13	39.4
02	15	9	7	0	1	0	23	9	39.8
03	113	101	-	-	-	-	113	101	89.0
04	21	19	23	19	-	-	44	38	86.3
05	122	75	67	11	-	-	189	86	45.5
06	57	0	-	-	-	-	57	0	00.0
07	39	36	-	-	-	-	39	36	92.3
TOTALS	375	240	110	38	13	5	498	283	56.8

To analyze the questionnaires which were returned, a frequency distribution was tabulated for each response to the first twelve (12) items. A chi-square, goodness-of-fit test of significance was then run on each item independently. It was hypothesized that the distribution of observed responses would not differ significantly from that of a rectangular frequency distribution. A compilation of the data collected on each of these items and the computation of the chi-square values is presented in Table 10.

The chi-square statistics calculated for the goodness-of-fit tests illustrate that the distribution of the response frequencies for all the items differed significantly from the hypothesized rectangular distribution. In each case, the probability of achieving the specific chi-square value or

Table 10

SUMMARY OF RESPONSES TO QUESTIONNAIRE BY PERCENTAGES

Item	Response	a	b	c	d	e	χ^2	p-value
1	In general, when did you fill in the teacher self-evaluation form for career education related activities?	4.1	9.0	9.0	3.0	74.8	503.51	.001
2	How accurately were you able to "describe" the career education activities you taught?	4.4	58.1	31.9	4.8	0.7	329.29	.001
Item	Response	1	2	3	4	5	χ^2	p-value
3	How clear are the directions for completing the form?	7.6	21.0	37.0	25.7	8.7	83.16	.001
4	How complete are the directions on the form?	4.7	14.9	36.6	33.0	10.9	108.63	.001
5	Is the format of the instrument laid out in a manner which is easy to follow?	13.6	18.3	29.7	30.4	8.1	53.05	.001
6	Is the material included in the instrument comprehensive?	4.8	16.7	34.8	29.3	14.4	78.00	.001
7	Is the instrument flexible enough to allow marking most career education activities?	5.1	14.5	27.6	38.2	14.5	92.21	.001
8	How would you rate the amount of time required to use the instrument?	3.0	11.9	33.1	27.9	24.2	81.53	.001
9	How valuable is the printed feedback to you as a teacher?	26.4	35.9	27.8	8.1	1.8	112.96	.001
10	Did you have difficulty marking the "Identification Code" section?	1.4	3.9	12.0	14.1	68.6	433.06	.001
Item	Response	Yes	No				χ^2	p-value
11	Have you made changes in your career education activities as a result of the feedback you received?	23.6	76.4				75.46	.001
12	Should the forms be modified before they are used again?	71.6	28.4				48.92	.001

larger was less than .001 ($p < .001$). The conclusions and/or recommendations resulting from the analysis of each item are noted below.

Item #1: The great majority of teachers waited until the end of each month to complete the form. This may have been one important reason why many teachers found it difficult to classify their instructional activities and why some felt it was time-consuming to complete the form. It may have also resulted in an inaccurate reporting of activities.

Item #2: Although most teachers felt the instrument allowed them to describe their activities very accurately or fairly accurately, a number felt the instrument did not enable an adequate description of their efforts. This may have been due to a need for greater clarification of the various sections of the form or the need for teachers to record their activities on a more frequent basis.

Items #3 and #4: The directions for completing the form were, for the most part, clear and complete. However, responses indicate that the directions may have to be changed for greater clarity. A carefully planned in-service training program might eliminate some of the problems encountered with the directions.

Items #5 and #7: Apparently the physical format of the instrument did not create a great deal of misunderstanding and there was sufficient flexibility for marking most activities. On the other hand, the difficulties perceived by some individuals may be alleviated by modifications in the form.

Item #6: The response distribution for this item indicates a feeling of general adequacy with respect to the instrument's comprehensiveness.

Item #8: Even though many teachers tended to feel the amount of time required to complete the form was minimal, a greater proportion may have felt this way if they had filled out the form on a daily basis rather than monthly.

Item #9: The perceived utility of the computer printout (feedback information) sent to each teacher was very low. This indicates a need to either discontinue this part of the formative evaluation or include a discussion of the purpose and the interpretation of the form in an in-service training program.

Item #10: Most teachers found it relatively easy to complete the information required for the "Identification Code" section of the form. Those who found it difficult may have been confused in classifying their curriculum area(s). This section may have to be changed on the revised form.

Item #11: The lack of change in instructional activities resulting from the feedback received by each teacher via the computer printout may have been a function of the need to clarify the purpose of this information. However, it may be that no change should have been reported.

Item #12: In general, the responses to this item indicate a need for a detailed in-service training program emphasizing the purpose of the self-evaluation instrument and the computerized feedback. Attention must also be given to increasing the clarity of the directions for completing the form and operationally defining the career education terminology used.

Each teacher made one or more subjective statements about the form or the computer printouts they received. These comments, in general, are summarized by the following seven statements:

1. The time required to complete the form was not worth the feedback received.
2. The instrument was vague in terms of
 - a) directions for completing the form, and
 - b) the instructional activities to be recorded.
3. The responses required were sometimes too general to be of value.
4. The responses required were sometimes too specific to be of value.
5. The purpose of the computer printout was unclear.
6. It was difficult to classify instructional activities.
7. The ambiguity of the various sections may result in inconsistent teacher responses.

It seems safe to conclude that there was some question as to the effectiveness of the formative (process) evaluation system as far as teachers were concerned. Some of the major problems pertaining to its effectiveness are as follows:

1. Teachers did not complete the form on a daily basis, but rather completed them at the end of the month. Consequently, the validity and reliability of their responses can be questioned.
2. Even though forms were completed at the end of the month, teachers believed that the data were quite accurate.
3. Directions for completing the form can and should be improved.
4. Modifications in the coding information blocks and format of the data collection part of the form can and should be improved.
5. Computer printouts were of questionable value to teachers although in-service training may reduce this problem.

**TEACHERS' ASSESSMENT OF THE SYSTEM FOR OBTAINING FEEDBACK
ABOUT THEIR CAREER EDUCATION ACTIVITIES**

Teacher's Name _____ Code Number _____

School _____ City _____

Directions

The purpose of this questionnaire is to solicit your opinions about the usefulness of the Teacher Self Evaluation Instrument you have been using. Your opinions will assist us to make decisions about the further use of the instrument and/or about modifications that would make it easier to use. Your constructive criticisms are appreciated. Check the appropriate category or rating for each of the questions listed below.

1. In general, when did you fill in the teacher self evaluation form for career education related activities? (check one)

☐ a. immediately after the activity
☐ b. at the end of the day
☐ c. at the end of the week

☐ d. at the end of each two weeks
☐ e. at the end of the month
2. How accurately were you able to "describe" the career education related activities you taught?

☐ a. very accurate (100%-80%)
☐ b. fairly accurate (60%-80%)
☐ c. not very accurate (40%-60%)

☐ d. very inaccurate (20%-40%)
☐ e. totally inaccurate (0-20%)
3. How clear are the directions for completing the form?

1	2	3	4	5
Unclear			Very Clear	
4. How complete are the directions on the form?

1	2	3	4	5
Incomplete			Complete	
5. Is the format of the instrument laid out in a manner which is easy to follow?

1	2	3	4	5
Confusing			Clear	
6. Is the material included in the instrument comprehensive?

1	2	3	4	5
Inadequate			Adequate	
7. Is the instrument flexible enough to allow marking most career education activities?

1	2	3	4	5
Inflexible			Flexible	
8. How would you rate the amount of time required to use the instrument?

1	2	3	4	5
Excessive			Minimal	
9. How valuable is the printed feedback to you as a teacher?

1	2	3	4	5
Worthless			Valuable	
10. Did you have difficulty marking the "Identification Code" section?

1	2	3	4	5
Difficult			Easy	
11. Have you made changes in your career education activities as a result of the feedback you received? Yes _____ No _____
12. Should the forms be modified before they are used again? Yes _____ No _____
13. What improvements in the instrument or the computer printout would you suggest? (List them)

PART II

ASSESSING THE IMPACT OF CAREER EDUCATION ON STUDENT ACHIEVEMENT

INTRODUCTION

Most of the national and state efforts toward implementing career education have been devoted to the in-service training of teachers and the development of curriculum and instructional materials. Relatively little effort has been expended towards developing valid and reliable criterion instruments to assess the impact that instructional programs have had on students. This is the second part of the evaluation report which deals primarily with the relative impact career education projects in Minnesota have had on the cognitive achievements of students in grades 1-9.

Purposes and Objectives

The purposes of this study were twofold: (1) to determine whether the instruments developed were reliable and sensitive to differences between and among various criterion groups and (2) to assess the relative impact the seven (7) career education projects had on their students. In order to determine whether these purposes were attained, the following specific objectives for the study were posed.

- Objective #1: To determine whether the career education tests were reliable and capable of discriminating among students in experimental and control groups at different grade (maturity) levels in terms of mean scores on the 1-3, 4-6, and 7-9 career education tests respectively-
- Objective #2: To determine whether there were differences between experimental and control groups in terms of the mean scores of students on the 1-3, 4-6, and 7-9 career education tests respectively.
- Objective #3: To determine whether there were differences among the seven (7) exemplary projects in terms of the mean scores of students on the 1-3, 4-6, and 7-9 career education tests respectively.

PROCEDURES

Instrumentation

A final form of three criterion instruments was developed to measure the cognitive achievement of students in grades 1-3, 4-6 and 7-9 respectively. A

pilot test of items was conducted in the fall of 1972 and as a result appropriate items which met specific criterion were selected and/or revised for inclusion in the final form of the instrument. (Smith, et al, 1973) Only a brief description of the rationale used to develop the three career education tests and the content of each test is provided in this report.

It is generally accepted that a comprehensive "product" evaluation of career education must include an assessment of both the cognitive and affective domains. The first phase of the evaluation (1972-73) was concerned only with developing tests to measure the cognitive achievements of students; subsequent phases will emphasize the development of instruments to measure a student's attitude toward the world of work in grades 1-9. Because most of the exemplary career education projects in Minnesota dealt only with elementary and junior high school students, criterion measures for the senior high school students were not developed.

The rationale for career education developed by the Minnesota RCU suggests that the first three stages of career development are: (1) occupational awareness (grades K-3), (2) occupational awareness and orientation (grades 4-6), and (3) occupational exploration (grades 7-9). These stages reflect a hierarchy of career development and student competencies. Therefore, separate instruments, measuring similar career education concepts, were developed for each of the three stages. Also, because of the developmental growth and/or maturity process, items were generated in a manner such that they would be sensitive to grade or maturity differences among students. Whether the tests are sensitive to differences between experimental projects and control groups was perceived as a function of the extent to which their students and/or their instructional programs differ.

The rationale and model also suggests that there are four major components which must be considered and taught as a part of career education: (1) career personality, (2) career environment, (3) career decision process, and (4) work adjustment. These components and the relationship among them are described in more detail in other sources (Moss, Smith, Copa, 1971; Smith, et al, 1973). Tests were developed for two of the sub-components: (1) career environment, and (2) decision making. These components were operationally defined in terms of the following content areas (scales) which are also shown in Appendix A: (1) industries, (2) occupational levels, (3) abilities, (4) needs--reinforcers, (5) working conditions, (6) career decision processes, and (7) employment trends. Items were systematically developed to measure student knowledge about selected aspects of each sub-category.

K-3 Test: The first instrument developed was designed to measure student "awareness" about the world of work. It was a 29 item test which was read to students by the test administrator and which required students to recognize and discriminate among pictures of occupational workers. Students were directed to put an "X" under the picture which best answered the question. Test items were generated to measure knowledge about the following content areas: (a) industries, (b) occupational levels, (c) ability requirements, (d) needs and/or job satisfactions, and (e) working conditions or characteristics.

4-6 Test: The second instrument was designed to measure the cognitive knowledges of students in grades 4-6. It was a 52 item, self-administered test in which students made their responses on a separate answer sheet designed to be scored by optical scanning equipment. The test consisted of 32 matching items and 20 multiple choice items. The content areas measured by the 4-6 test included (a) industries, (b) occupational levels, (c) ability requirements, (d) needs and/or job satisfactions, (e) working conditions, and (f) career decision making processes.

7-9 Test: The third instrument was designed to measure the cognitive knowledges of students in grades 7-9. It was a 56 item, self-administered, multiple choice test in which students made their responses on a separate answer sheet designed to be scored by optical scanning equipment. The content domains measured by the test included: (a) industries, (b) occupational levels, (c) ability requirements, (d) needs and/or job satisfactions, (e) working conditions, (f) career decision making process and (g) employment trends.

Each of the tests was considered to be a "power" test rather than a "speed" test, but could be administered in about 30-45 minutes.

Population

Two sub-populations of students were identified for this study. One population was defined as "experimental" and the other was defined as "control". The experimental population was defined as all of the students in grades 1-9 who were receiving instruction in career education from teachers participating in each of the seven experimental career education projects. Teachers who participated in the project were defined as those who were selected to complete a monthly teacher self-evaluation form. The "control" population was defined as selected classes of students in either the experimental projects or in separate schools who, according to the project directors or the school principal, respectively, had not received formal instruction in the area of career education. In those instances where not all of the teachers were participating in the exemplary project, the project director selected classes of students within the school district which were to serve as an appropriate control group. In instances where all of the teachers in the district were involved in the experimental project, classes of students in a separate, but comparable school in the geographic area were selected as the appropriate control group.

Table 2 shows the total number of students by grade level and by experimental and control groups who participated in the evaluation study. There was a total of 10,901 students involved in the study with 8048 defined as "experimental" students and 2853 defined as "control" students. The numbers of students within each experimental project differed greatly because of the different number of teachers participating within each project. Each of the seven projects are numbered 01 through 07 respectively.

Table 2

POPULATION OF STUDENTS IN EXPERIMENTAL AND CONTROL SCHOOLS
WHO WERE ADMINISTERED CAREER EDUCATION TESTS GRADES 1-9

Grades and Treatments		01	02	03	04	05	06	07	Total
Experimental Students	1	18	25	356	76	204	206	119	1004
	2	19	28	365	79	233	248	143	1115
	3	19	86	438	83	226	216	129	1197
	Sub Total	56	139	1159	238	663	670	391	3316
	4	64	27	403	89	245	304	125	1257
	5	163	104	403	83	293	218	151	1415
	6	194	50	372	104	240	233	161	1354
	Sub Total	421	181	1178	276	778	755	437	4026
	7	34	--	--	87	75	--	--	196
	8	22	--	--	91	78	--	--	191
	9	50	93	--	86	90	--	--	319
	Sub Total	106	93	--	264	243	--	--	706
	Total	583	413	2337	778	1684	1425	828	8048
Matching Control Students	1	17	53	53	53	45	44	50	315
	2	16	44	53	55	54	51	40	313
	3	24	46	55	39	52	49	52	317
	Sub Total	57	143	161	147	151	144	142	945
	4	31	45	54	48	47	24	44	293
	5	33	59	61	53	52	51	48	357
	6	94	55	45	50	53	45	51	393
	Sub Total	158	159	160	151	152	120	143	1043
	7	60	76	--	54	100	--	--	290
	8	96	72	--	57	101	--	--	326
	9	27	75	--	51	96	--	--	249
	Sub Total	183	223	--	162	297	--	--	865
	Total	398	525	321	460	600	264	285	2853

Test Administration

The tests were administered to students within the experimental projects by substitute teachers from each of the respective school districts. A test administrator's manual was written and a one day workshop was conducted to inform the substitute teachers about the correct procedures for administering each of the three career education tests. The staff of the Minnesota RCU administered the tests to students in the schools identified as control groups. Tests were administered simultaneously to students in both the experimental and control schools during the first and second week of May, 1973.

Data Analysis

Data for the K-3 test were keypunched and then scored and analyzed by specially developed computer programs. Answer sheets for the 4-6 and 7-9 test were read and scored by the optical scanning equipment available at the Student Counseling Bureau, University of Minnesota and then analyzed by specially developed computer programs. The following descriptive statistics were used to analyze the data: (a) frequency, (b) means, (c) standard deviations, (d) Hoyt's reliability coefficient and (e) percentages. Means were computed for both total scores and separate scale scores, but only the mean scores for the total test are presented in this report.

FINDINGS

Objective 1:

To determine whether the career education tests were reliable and capable of discriminating among students in experimental and control groups at different grade (maturity) levels in terms of their mean scores on the 1-3, 4-6, and 7-9 career education tests respectively.

In order for the three tests to be of any use as a criterion measure, they must be reliable and capable of discriminating between or among various criterion groups. It was hypothesized that if they were reliable and sensitive to differences among grade or maturity levels, the tests would then be capable of detecting differences between experimental and control projects where, in fact, instructional differences existed.

Table 3 shows the data for the three tests separately by grade level within experimental, control, and for the combined groups of students. The findings are discussed separately for each of the three career education tests.

Table 3

A COMPARISON OF EXPERIMENTAL AND CONTROL GROUPS
BY GRADE LEVEL FOR THE 1-3, 4-6 AND 7-9 TESTS

Grades		Experimental					Control					Combined Groups							
		N	$\bar{X}$	%	Corr.	Sd	r	N	$\bar{X}$	%	Corr.	Sd	r	N	$\bar{X}$	%	Corr.	Sd	r
1-3 Test 29 Items	1	1004	12.17	42%	3.40	.48	315	12.21	42%	3.44	.51	1319	12.19	42%	3.42	.50			
	2	1115	15.22	52%	3.65	.56	313	14.51	50%	3.64	.56	1428	14.87	51%	3.65	.56			
	3	1197	17.26	60%	3.63	.57	317	16.91	58%	3.51	.54	1514	17.09	59%	3.57	.56			
	Totals	3316	14.88	51%	3.56	.54	945	14.54	50%	3.53	.54	4261	14.72	51%	3.55	.54			
4-6 Test 52 Items	4	1258	22.28	43%	6.13	.71	293	21.66	42%	5.89	.69	1551	21.97	42%	6.01	.70			
	5	1415	26.23	50%	6.38	.74	357	25.88	50%	5.93	.70	1772	26.06	50%	6.16	.72			
	6	1354	29.10	56%	6.38	.75	393	28.39	55%	6.11	.72	1747	28.75	55%	6.25	.74			
	Totals	4027	25.87	50%	6.30	.73	1043	25.31	49%	5.98	.70	5070	25.59	49%	6.14	.72			
7-9 Test 56 Items	7	196	29.76	53%	9.34	.87	290	29.80	53%	7.77	.80	486	29.78	53%	8.56	.84			
	8	191	32.77	59%	8.63	.85	326	33.79	60%	8.37	.84	517	33.28	59%	8.50	.85			
	9	313	37.34	67%	8.40	.85	249	36.89	66%	7.54	.81	562	37.12	67%	7.97	.83			
	Totals	700	33.29	60%	8.99	.86	865	33.49	60%	23.68	.82	1565	33.39	60%	8.34	.84			

Findings: K-3 Test A total of 4261 students were administered the career education test in grades 1-3; 3316 and 945 students were enrolled in the experimental and control schools respectively.

The test appeared to be equally reliable for both experimental and control students, although the reliability coefficients were not very high (averaged about .54). Reliability coefficients ranged from a low of .45 to a high of .57. In general, the tests seemed to be slightly more reliable for the older students than for the younger students.

It seems apparent that the 1-3 test consistently detected differences among grade or maturity levels for both experimental and control groups. That is, the mean scores and percent of items correct were consistently lower for first graders than the second graders and consistently lower for second graders than the third graders for both the experimental and control groups.

The complete data for each of the experimental and control groups by grade level is shown in Appendix B. The findings previously discussed are also supported by these data: (1) reliability coefficients ranged from a low of .33 to a high of .75 with the highest reliabilities being achieved by the older students and (2) the mean scores for students within each of the experimental and control projects was in every case lower for first graders than second graders and lower for second graders than third graders.

Findings: 4-6 Test A total of 5070 students were administered the 4-6 career education tests; 4027 students comprised the experimental group with 1043 students in the control group. The test seemed to have equally high reliability coefficients for both experimental and control groups. The average reliability coefficient was about .72 and ranged from a low of .69 to a high of .75. It appeared that the tests were slightly more reliable for the older students than the younger students.

It also appears that the 4-6 test was very sensitive to differences among grade or maturity levels for students in both the experimental and control groups. That is, in terms of the mean scores and percent of items correct, fourth graders consistently scored lower than fifth graders and fifth graders consistently scored lower than sixth graders.

Appendix B shows the complete data for each of the experimental and control groups by grade level. These data support the findings previously discussed: (1) the average reliability was .72 and ranged from a low of .54 in one project to a high of .84 in another project and (2) the 4-6 test, in every instance, was capable of detecting differences among grade or maturity levels for students in both the experimental and control groups.

Findings: 7-9 Test A total of 1564 students were administered the career education tests for grades 7-9; 700 were enrolled in experimental projects and 865 were enrolled in the control schools.

The 7-9 test appeared to have equally high reliability coefficients for students in both the experimental and control groups. The average reliability coefficient for the combined groups was .84 and ranged from a low of .80 to a high of .87. In general, the test seemed slightly more reliable for the students in the experimental projects than for the students in the control projects.

The test also seemed to be quite sensitive to detecting differences among grade or maturity levels for students in both the experimental and control groups. In terms of mean scores and percent of items correct, seventh graders consistently scored lower than eighth graders and eighth graders consistently scored lower than ninth graders.

The complete data for the 7-9 test by grade level for each of the experimental and control groups is shown in Appendix B. These data support the previously discussed findings that (1) the test was equally reliable for both experimental and control groups with the reliability coefficients ranging from a low of .77 to a high of .91, and (2) the test, in every instance, was sensitive to differences among grade or maturity levels for both experimental and control groups.

In general, it seems safe to conclude that (a) the 4-6 and 7-9 tests have higher and more satisfactory reliabilities than the 1-3 test although all tests were equally reliable for students in both experimental and control groups and (b) the tests were consistently sensitive to and were capable of discriminating among grade or maturity levels for students in both experimental and control groups. These findings suggest that the tests are sufficiently reliable and sensitive to detect and interpret differences between and among experimental and control groups where, in fact, meaningful differences exist.

Objective 2:

To determine whether there were differences between experimental and control groups in terms of the mean scores of students on the 1-3, 4-6, and 7-9 career education tests respectively.

A series of three tables are used to present the data concerning the relative differences between experimental and control groups for each of the three career education tests. These data are intended to demonstrate whether the career education tests are sensitive to differences between students who have received formal instruction in career education and those who have not received formal instruction in career education. It was hypothesized that there would be greater instructional differences (although the exact nature of the differences are not known) between experimental and control groups than among the seven experimental projects.

Table 4 shows the data for students in experimental and control groups (collapsed across projects) for each of the three career education tests.

Table 4

A COMPARISON OF EXPERIMENTAL AND CONTROL GROUPS FOR THREE CAREER EDUCATION TESTS

Grades	Experimental				Control				Combined Groups			
	N	$\bar{X}$	%	Corr. r	N	$\bar{X}$	%	Corr. r	N	$\bar{X}$	%	Corr. r
1-3 Test (29 Items)	3316	14.88	51%	.54	945	14.54	50%	.54	4261	14.72	51%	.54
4-6 Test (52 Items)	4027	25.87	50%	.73	1043	25.31	49%	.70	5070	25.59	49%	.72
7-9 Test (56 Items)	700	33.29	60%	.80	865	33.49	60%	.82	1565	33.39	65%	.84

Table 5

A COMPARISON OF EXPERIMENTAL PROJECTS
AND THEIR RESPECTIVE CONTROL GROUPS
IN TERMS OF STUDENT TESTS SCORES
FOR GRADES 1-3, 4-6 AND 7-9

Treatment Groups	PROJECTS												Grand Totals												
	01			02			03			04						05			06			07			
	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r	
1-3	Exp.	56	15.34	.63	139	15.41	.66	1159	15.15	.68	238	14.27	.69	663	15.18	.65	670	14.86	.56	391	15.02	.68	3316	15.03	.65
	Cont.	57	14.12	.70	143	15.03	.64	161	14.81	.65	147	13.97	.66	151	14.30	.62	144	15.37	.52	142	13.96	.67	945	14.51	.64
4-6	Exp.	422	25.30	.77	181	27.19	.75	1178	26.72	.77	276	26.74	.80	778	25.20	.77	755	25.06	.79	437	26.46	.77	4027	26.10	.77
	Cont.	158	25.27	.72	159	26.57	.74	160	25.17	.75	151	24.40	.79	152	25.84	.78	120	25.67	.75	143	26.59	.73	1043	25.64	.75
7-9	Exp.	106	31.10	.91							258	32.62	.86	243	34.45	.85							607	32.72	.87
	Cont.	183	31.73	.88							162	36.15	.79	297	33.38	.82							865	33.46	.83

By collapsing the data for experimental and control groups for each of the three tests, there appears to be almost no difference between experimental and control groups on any of the three tests. The differences between the mean scores for experimental and control groups on the 1-3, 4-6, and 7-9 career education tests are .34, .56, and .20 respectively. Students in the experimental projects for tests 1-3 and 4-6 had slightly higher mean scores than the students in the control group, but the trend was reversed for the 7-9 test; students in the control groups scored higher than students in the experimental groups. It should be noted, however, that students in only three experimental and control schools were administered the 7-9 test, thus, the comparative differences may be misleading. The average percent of items correct and the average reliability coefficients for students in the experimental and control groups were almost identical.

Table 5 presents the data separately for each of the matched experimental and control projects (sites) according to student performance on the 1-3, 4-6, and 7-9 career education tests respectively. There appear to be very little difference in the mean scores of students between each of the matched experimental and control groups for any of the three career education tests, although the reliability coefficients for the matched projects are quite similar and appear to be within the range of acceptance.

Differences in mean scores for matched control-experimental groups for the 1-3 test ranged from a low of -.51 in favor of the control project group (project 06) to a high of +1.06 in favor of the experimental group (project 07). While most of the observed differences were not very large, it appears that experimental students consistently scored higher on the test than their counterparts in the control groups.

The differences in mean scores for matched experimental and control groups for the 4-6 test ranged from a high of .64 in favor of a control group (project 05) to a high of 2.34 in favor of an experimental group (project 04). The reliability coefficients were approximately the same and satisfactorily high for each of the matched experimental and control groups. Four out of the seven comparisons of differences in mean scores favored the experimental groups and the remaining three comparisons favored the control groups.

Matched experimental and control groups for the 7-9 career education test were available for only three projects which involved a total of 1472 students. The reliability coefficients were quite high and very similar for each of the matched experimental and control groups. The largest difference between mean scores was 3.53 in favor of a control group. Of the three comparisons made, two of the differences favored the control groups and only one favored the experimental group.

The complete data for each of the experimental and control groups is presented by grade level in Appendix B. While it is apparent that the differences between experimental and control projects are not very large, it seems important to assess whether there is a trend in favor of the experimental or the control groups.

Table 6 summarizes the data by grade level for the 1-3 and 4-6 career education tests in terms of the number of times the mean scores for the experimental groups were higher or lower than the mean scores for the matched control groups.

Data are not presented for the 7-9 test because of the limited number of comparisons and projects involved.

Table 6

NUMBER OF TIMES THE MEAN SCORES OF EXPERIMENTAL
GROUPS WERE HIGHER OR LOWER THAN CONTROL
GROUPS FOR TESTS 1-3

	Grade 1	Grade 2	Grade 3	Totals
Higher	4 19%	5 23%	5 23%	14 67%
Lower	3 14%	2 10%	2 10%	7 33%
Totals	7 33%	7 33%	7 33%	21 100%

Table 7

NUMBER OF TIMES THE MEAN TEST SCORES OF EXPERIMENTAL
GROUPS WERE HIGHER OR LOWER THAN CONTROL
GROUPS FOR GRADES 4-6

	Grade 4	Grade 5	Grade 6	Totals
Higher	3 14%	4 19%	3 14%	10 48%
Lower	4 19%	3 14%	4 19%	11 52%
Totals	7 33%	7 33%	7 33%	21 100%

The data suggest that there seems to be a trend for experimental students to score higher on the 1-3 career education test than their counterpart control groups (67% of the comparisons were in favor of the experimental groups and 33% favored the control groups). Similar trends do not exist for the students who took the 4-6 test. Forty-eight percent of the comparisons favored the experimental groups, but fifty-two percent of the comparisons favored the control groups.

It seems safe to conclude that there was relatively little difference between the performances of students in matched experimental and control groups. The three tests seemed quite reliable and capable of detecting differences, but the magnitude of these differences was relatively small. On the other hand, while the magnitude of the differences were relatively small, there does seem to be a trend (at least in grades 1-3) for students in experimental groups to score higher on the tests than students in the control groups. These trends were not as evident for students in grades 4-6 and appeared to be reversed for students in grades 7-9 (control groups scored higher than experimental groups).

It is also interesting to point out that the tests appeared to be equally reliable for both experimental and control groups and have sufficiently high reliability coefficients (with the possible exception of the 1-3 test) such that the findings can be interpreted with a degree of confidence.

Objective 3:

To determine whether there were differences among seven (7) exemplary career education projects in terms of the mean scores of students on the 1-3, 4-6, and 7-9 career education tests respectively.

One of the original goals of the seven site career education model was to provide each site the opportunity to implement the concept of career education in different ways and using different combinations of instructional techniques. The purpose of this objective is to determine whether the three career education tests were sensitive to instructional differences among the seven (7) experimental projects.

Table 8 shows the combined mean scores and reliability coefficients for each of the seven exemplary projects for the 1-3, 4-6, and 7-9 career education tests respectively. Data are collapsed by grade level for each of the experimental projects for each of the three tests.

A total of 3316 students in the seven (7) exemplary projects were administered the 1-3 career education tests.

The data shown in Table 8 suggest that while the test was apparently sensitive to differences among exemplary projects, the magnitude of these differences were quite small. The mean scores ranged from a high of 15.29 to a low of 14.19 and the difference in mean scores ranged from a low of .04 to a high of 1.1. Considering data were collapsed across grades, these differences can hardly be thought to be "educationally significant". The reliability coefficients for the comparisons were generally low (average of .53) but were quite consistent among the comparison groups. While slight differences were detected, it is not known whether these were due to instructional differences among the programs or to the reliability of the tests. Additional research may be needed to answer this question.

A total of 4027 students in the seven (7) exemplary projects were administered the 4-6 career education test. The mean scores for the seven projects ranged from a high of 26.80 to a low of 24.16. Differences in mean scores among projects ranged from a high of 2.64 to a low of .16. The test seemed to be quite reliable for all of the comparison groups; the average reliability coefficient was .73 and the coefficients ranged from a low of .70 to a high of .76.

Table 8

A COMPARISON OF GIVEN EXEMPLARY PROJECTS
IN TERMS OF THE COMBINED DATA FOR
THREE CAREER EDUCATION TESTS¹

Projects	GRADE LEVELS								
	1-3			4-6			7-9		
	N	$\bar{X}$	r	N	$\bar{X}$	r	N	$\bar{X}$	r
01	56	15.29	.47	422	24.16	.71	106	29.99	.90
02	139	14.32	.58	181	26.34	.70	² 93	39.75	.80
03	1520	14.96	.57	1178	26.80	.72			
04	238	14.19	.57	276	26.59	.76	348	32.65	.84
05	663	15.07	.50	778	25.23	.71	243	34.21	.83
06	670	14.82	.45	775	25.39	.76			
07	391	14.92	.59	437	26.14	.71			
Totals	3316	14.80	.53	4027	25.87	.73	700	32.29	.86

¹Data are collapsed by grade levels for each test.

²Data shown are only for 9th grade students.

It appears that the 4-6 test was capable of reliably detecting differences among exemplary projects. Because the reliability for the test was quite high, the findings may suggest that there may, in fact, be differences in instructional emphasis among the projects and that the 4-6 test is capable of detecting these differences.

A total of 700 students in the exemplary projects were administered the 7-9 career education test. The test seemed capable of reliably detecting rather large differences among the four exemplary projects which involved junior high school students. Excluding the one group of ninth grade students (project 02) from the comparisons, the mean scores of the three projects ranged from a low of 29.99 to a high of 34.21 and yielded a range of differences in mean scores from a low of 2.66 to a high of 4.32. The 7-9 test was the most reliable of the three career education tests; reliability coefficients for the comparisons ranged from a low of .80 to a high of .90, yielding an average reliability of .86. Again, because the reliability of the comparisons were quite high, the findings may suggest that students in the three projects did receive different types or amounts of instruction or that the students were already quite different in terms of their

knowledge of "work" before the career education projects were started.

The complete data by grade level for the seven exemplary projects are shown in Appendix B. While these data support the previous finding concerning the reliability of the three tests and the relative differences among the seven (7) exemplary projects, the differences are not very systematic when grade level is considered. That is, when making comparisons among the projects by grade level, the first graders may score higher in one project than in another project, but the situation may be just the opposite when comparing differences in mean scores for the second and third graders in the same projects. This may indicate that teachers at certain grade levels within a project were more involved with career education than teachers at other grade levels and that the emphasis at various grade levels was not consistent among the seven exemplary projects.

LIMITATIONS, SUMMARY, AND CONCLUSIONS

Limitations

This study has two types of limitations. The first pertains to the way in which the experimental and control populations were identified. The second limitation involves the validity and reliability of the tests.

The experimental population was defined as all of the students who had received instruction from teachers who were participating in the career education project as identified by the director of each project. While the "process" evaluation provides clues as to the amount of time teachers devoted to career education activities and a gross estimate of the content, the exact content of their instruction as related to the tests which were administered to their students is not known. Also, because of the way in which "control" students were identified, it is not known whether or how these students differed from students in the experimental project in terms of their knowledge of career education or in terms of how much (if any) instructional emphasis was placed on career education. All that can be said is that these students were not receiving "formal" instruction in career education, but it is entirely possible that teachers in these schools did, in fact, teach concepts related to career education as a part of their regular day-to-day classroom instruction. In general, it is not possible to attribute any causal relationships from the findings, however, it is possible to describe differences where differences existed and attempt to suggest possible reasons for these differences.

The second limitation of the study pertains to the validity and reliability of the three career education tests. The tests were developed in a manner that was internally consistent with the rationale and theoretical model for career education developed by the Minnesota RCU. While the project directors were somewhat familiar with the rationale and model, it is likely that their teachers had either no knowledge or at least only limited knowledge of it. Also, neither the teachers or directors had advance knowledge about the concepts included in the tests. Thus, the tests and the findings of the study truly represent an external evaluation of what students should theoretically have learned rather than what they may, in fact, have learned. It may very well be that the tests have limited content validity in terms of the concepts teachers emphasized in their instructional activities. In addition the findings are limited by the reliability of the instruments. In instances where test reliabilities are low, the validity

of the findings may be questioned. However, as has been previously shown, the 4-6 and 7-9 tests appear to be quite reliable and thus should yield valid and meaningful conclusions. Less confidence can be placed on the conclusions dealing with the 1-3 career education test.

Summary

The summary of the study follows the sequence in which the objectives and findings of the study were discussed. The major findings of the study are summarized below.

1. Each of the three career education tests appear to be sensitive to differences among grade or maturity levels for both experimental and control groups. While these differences were not large, they were, in all instances, consistent for experimental and control groups separately and collectively.
2. Each of the three career education tests were equally reliable for experimental and control groups. The average reliability coefficients for the 4-6 and 7-9 tests were .75 and .85 respectively and were sufficiently high to place confidence in the findings of the study. The average reliability for the 1-3 test was only about .54. This may suggest that when differences were reported they may, in fact, be real differences or be differences attributable to low reliability. (The low reliability for the 1-3 test was probably due to the length of the test (only 29 items) rather than to any inconsistency in student responses.)
3. Students in experimental projects tended to have slightly higher mean scores on the 1-3 and 4-6 career education tests than their respective control groups. Conversely, students in the control groups tended to have a higher mean score on the 7-9 career education test than their respective experimental groups. Differences for the 1-3 test tended to be quite small, but were considerably larger for the 4-6 and 7-9 tests. In general, the tests seemed to be capable of detecting differences between experimental and control groups where, in fact, differences exist.
4. There were differences among the seven experimental projects in terms of the mean scores of students for each of the three career education tests. These differences were quite small for the 1-3 test, but were considerably larger for the 4-6 and 7-9 tests. However, by looking at the mean scores of the seven exemplary projects by grade level, inconsistencies are evident. That is, it seemed evident that instructional emphasis at various grade levels were quite different among the seven projects, consequently systematic differences among the projects by grade level were not evident.

Conclusions

The conclusions are presented in relationship to the two major purposes of the study:

- (1) To develop a reliable, valid set of career education instruments designed to measure the cognitive achievement of students in grades 1-9, and (2) to assess the relative impact of career education projects on student achievement.

In general, it seems safe to conclude that the three career education instruments used in the study were quite reliable and valid in terms of detecting meaningful differences among various criterion groups of students who were administered the tests. It is apparent that the 4-6 and 7-9 tests possess adequate reliability for the purpose of making meaningful comparisons among a wide range of criterion groups. There may, however, be some question about the reliability of the 1-3 test. It seems likely that this test may have to be lengthened before its reliability can be improved. However, it is encouraging to note that each of the tests were capable of detecting differences (however slight they may have been) among various criterion groups. They were able to detect differences among grade (maturity) levels of students and to detect differences between experimental projects. It is, therefore, concluded that the findings discussed in the study are based on the use of instruments which have demonstrated reliability and construct validity.

In terms of the relative impact that the career education projects had on students, it seems safe to conclude that the impact was minimal. There were only slight differences between experimental and control students or among students in the exemplary projects. However, while the magnitude of these differences were slight, these differences (except in grades 7-9) tended to favor students in the experimental projects.

Obviously, this report raises many interesting (if not perplexing) questions concerning both the characteristics of the instruments as well as the relative impact (or lack of it) of career education instruction on students. Part III of this report will attempt to address these questions by interpreting the results of the findings for the process and product evaluations and speculate about the relationship between the two sets of findings.

APPENDICES

Appendix A: Content Domains and Elements of Content
for Career Education Tests K-9

Appendix B: A Comparison of Experimental and Control
Projects by Grade Level as Measured by
Total Test Scores

Appendix A

Table 1

CONTENT DOMAINS AND ELEMENTS OF CONTENT
FOR CAREER EDUCATION TESTS K-9

Industry	Occupational Level	Abilities	Needs	Working Condition	Career Decision Process	Employment Trends
Construction	Professional & Technical	Mental	Ability Utilization	Training Time	Personal Characteristics	Industrial Growth & Decline
Manufacturing		Verbal				
Natural Resources	Managers & Owners	Numerical	Achievement	Aptitudes	Sources of Occupational & Educational Information	Trends in Employment of Women
Transportation	Clerical	Spatial Reasoning	Activity	Temperaments		
Marketing & Advertising	Sales	Reaction Time	Advancement	Interests		
Communication	Craftsmen	Physical Strength & Size	Authority	Physical Capacities	Career Expectations	Causes of Employment Growth & Decline
Government & Finance	Operatives	Sex Coordination & Dexterity	Company Policies & Practices	Working Conditions	Career Capacities	Impact of Technology on Employment
Public Utilities	Service Personnel	Senses	Compensation		Career Opportunities	
Education & Research	Laborers	Age Reaction Time	Co-Workers		Selection of School Subjects	
Health & Welfare		Scholastic Aptitude	Creativity		Relationship of School to Career Choices	
Recreation		Basic Learning Skills	Independence			
Art & Entertainment		Interpersonal Skills	Moral Values			
Personal		Occupational Skills	Recognition			
Consumer & Homemaking		Non-Work Skills	Responsibility			
		Specialized Occupational Skills	Security			
		Professional Skills	Soc. Status			
		Occ. Skills	Supervision			
		Ed. Skills	Human Rel.			
		Voc-Tech. Skills	Supervision Technical			
		Attitudes	Variety			
		Cog. Skills	Working Cond.			
		Manipulative Skills	Autonomy			

APPENDIX B

Table 4

A Comparison of Experimental and Control Projects
by Grade Level as Measured by Total Test Scores

Criterion Group by Grade	PROJECTS																								Grand Totals								
	01				02				03				04				05				06								07				
	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{X}$	Sd	r	N	$\bar{Y}$	Sd	r	
Experimental	1	18	12.67	2.89	.33	25	12.96	3.26	.45	356	12.08	3.52	.52	76	11.24	3.88	.61	204	12.05	3.21	.42	206	12.67	3.09	.38	119	12.13	3.55	.53	1004	12.26	3.34	.46
	2	19	14.47	2.29	.45	25	15.14	4.64	.75	365	15.31	3.75	.58	79	14.37	3.43	.51	233	15.63	3.55	.54	248	15.03	3.46	.51	143	15.60	3.72	.59	1115	14.79	3.55	.56
	3	19	18.74	3.54	.63	86	16.86	3.52	.54	438	17.50	3.77	.61	83	16.95	3.68	.59	226	17.54	3.49	.54	216	16.75	3.26	.47	129	17.03	3.91	.64	1197	17.34	3.60	.57
	4	65	20.17	5.40	.63	27	22.37	6.03	.71	403	23.34	6.14	.72	89	22.81	6.17	.71	245	21.40	5.85	.69	304	21.88	6.33	.73	125	22.26	5.95	.69	1258	22.28	6.13	.71
	5	163	25.25	5.97	.70	104	27.52	6.28	.74	403	27.18	6.11	.72	83	27.37	6.89	.78	293	25.17	6.36	.73	218	25.37	6.73	.77	151	26.56	6.28	.73	1415	26.23	6.38	.74
	6	194	27.06	7.07	.79	50	29.12	5.37	.66	372	29.88	6.11	.73	104	29.60	6.65	.78	240	29.12	6.06	.72	233	28.92	6.64	.77	161	29.62	5.96	.72	1354	29.10	6.38	.75
	7	34	27.09	10.00										87	29.44	9.37	.87	75	31.35	8.51	.84									196	29.76	9.34	.87
	8	22	27.41	10.61	.90									91	33.98	8.19	.83	78	32.88	8.06	.82									191	32.77	8.63	.85
	9	50	35.46	10.58	.91	93	39.75	6.98	.80					80	34.52	8.07	.83	90	38.40	7.80	.83									313	37.34	8.40	.85
Control	1	17	10.24	2.41	.32	53	13.51	3.98	.66	53	11.92	3.42	.50	53	11.53	3.05	.38	45	11.71	3.29	.45	44	14.45	3.21	.45	50	11.00	2.48		315	12.05	3.12	.44
	2	16	12.56	4.02	.64	44	14.77	3.43	.54	53	14.96	3.88	.62	55	14.75	3.35	.49	54	14.02	3.27	.44	51	14.55	3.52	.52	40	14.72	4.27	.69	313	14.33	3.68	.56
	3	24	17.92	2.36	.45	46	17.02	3.47	.56	55	17.45	2.97	.35	39	16.21	4.61	.74	52	16.85	3.63	.55	49	17.06	3.06	.41	52	16.23	3.78	.61	317	16.96	3.41	.52
	4	31	20.68	5.76	.68	45	22.53	6.41	.74	54	22.30	5.71	.67	48	21.25	5.84	.69	47	20.40	6.10	.70	24	21.96	6.48	.75	44	22.27	5.14	.52	293	21.66	5.89	.69
	5	33	23.64	5.58	.64	59	26.73	5.82	.70	61	26.13	6.63	.76	53	24.70	6.23	.73	52	26.81	5.46	.66	51	25.63	5.81	.68	48	26.60	5.35	.65	357	25.89	5.93	.70
	6	94	27.36	5.65	.67	55	29.69	4.73	.54	45	27.33	6.25	.73	50	27.10	8.02	.84	53	29.70	5.70	.69	45	27.71	6.37	.75	51	30.29	5.45	.66	393	28.39	6.11	.72
	7	60	26.25	7.91	.81	76	28.66	7.20	.77					54	33.50	6.31	.72	100	30.79	7.83	.81									290	29.80	7.77	.80
	8	96	34.17	9.60	.83	72	31.11	8.09	.82					57	35.46	6.72	.76	101	34.41	7.84	.82									326	33.79	8.27	.84
	9	27	35.26	7.89	.82	75	37.93	6.49	.75					51	39.75	7.12	.82	96	35.01	7.90	.82									249	36.89	7.54	.81

PART III

INTERPRETATIONS OF THE FINDINGS

INTRODUCTION

The purpose of this section is to relate the findings of the process and product evaluations and suggest some plausible explanations for these findings. This discussion may provide a basis for modifying the evaluation process or instrumentation or it may encourage modification in the way career education is implemented in the seven project schools.

In terms of cognitive achievement, findings indicate that career education instruction apparently had relatively little impact in producing differences (a) between matched groups of experimental and control students and (b) among the students in the different experimental projects. That is, any differences observed, were small and not always in favor of the experimental projects. Three plausible explanations could account for these findings: (1) Instruments used to assess the cognitive achievements of students may not have been valid or reliable, (2) Selection of matched control groups may have been inappropriate or (3) instruction in career education may have been inadequate in terms of the processes used and/or the instructional time spent on career education during the first year of the project. Each of the three factors is discussed separately in the sections that follow.

Validity of Criterion Instruments

The criterion instruments were developed in a manner that was internally consistent with the rationale and model for career education developed by the members of the staff of the Minnesota RCU. Items included on the test were selected on the basis of their ability to (a) discriminate among students at different grade levels and (b) reliably measure the concepts suggested by the rationale (based on a pilot test of the items). The test items represented only a sample of the types of concepts derived from the theoretical model of career education. The items were reviewed by several individuals and groups who were knowledgeable about concepts related to career education. In most instances the items were judged to be an adequate sample of important career education concepts. However, a discrepancy between what career education could theoretically teach and what teachers said they taught became obvious, therefore the instruments may have had limited face validity. Regarding construct validity, it was reasoned that if the tests could reliably detect differences in student performance among grade levels, then it was likely that the tests could also detect differences among or between programs which differ in the amount of instructional emphasis related to career education. The tests did show internal reliability and a capability for discriminating among students at different grade levels for both the experimental and control groups.

However, it may be argued that the reason larger differences were not found between or among the experimental and control projects was that test items did not sample the content taught. Because of the way in which items were derived, it seems unlikely that they were totally unrelated to the content or concepts taught by teachers even though teachers indicated they placed more emphasis on the development of attitudes than they did on cognitive content. Regardless of the reason, the findings do suggest that additional effort should be devoted to modifying the items and improving the content validity of these cognitive instruments.

Identification of Control Groups:

Another factor which may help to explain the relatively small observed differences between the mean scores of students in experimental and control groups is the manner in which control groups were identified. In general, control groups were identified by either a project director or a school principal as those teachers who (to their knowledge) had not modified their course content to teach career education concepts. It is likely that all teachers, to some extent, teach concepts related to career education as a part of their regular course content, and that educationally significant differences could not be detected because career education concepts were, in fact, taught to students in the control schools. This does not imply that students in the experimental projects did not learn more about career education than students in the control groups, it simply means that they did not learn the concepts included on the tests of cognitive achievement and thus educationally significant differences were not detected between experimental and control projects.

Emphasis on Career Education Instruction:

Another factor that could explain the relatively small differences in the mean scores of students between and among experimental and control groups was the emphasis placed on career education by the teachers in the experimental projects. Instructional emphasis was determined by the responses of teachers to the monthly self-evaluation form used to describe the "processes" teachers used to implement career education in their classrooms. The basic question seems to be "Did teachers spend enough time on career education activities and spend it in a manner that would most likely make the greatest impact on student achievement?"

A partial answer to this question may be provided by looking at a "instructional profile" of an average career education teacher for a seven month period. The average teacher conducted twenty career education activities that were integrated with regular course content. These activities required a total of thirty-five hours of instruction and preparation time, which was devoted primarily to concepts such as self-awareness, occupational industries, and general knowledge about workers. Stated in another way, the average teacher spent about five (5) hours a month or 1.25 hours per week on career education activities that were integrated with the regular course content. This suggests that less than three percent (2.43%) of the teacher's time was spent on instructional activities that were specifically identified as career education instruction.

Assuming that the data provided by teachers on the self-evaluation form were accurate, it can be argued that the amount of instructional emphasis and/or the integration of career education concepts with regular course content was inadequate for making an observable impact on the cognitive achievement of students in the experimental projects. This conclusion suggests that if an observable impact on the cognitive achievements of students is desired, the instructional profile in the experimental projects needs to be changed. It could be changed in the following ways: (a) conduct more instructional activities related to career education, (b) devote more and a greater percent of time to career education each day, week or month, (c) modify instructional emphasis to include concepts related to the career planning process, occupational levels and work role requirements, and (d) teach career education concepts as separate units, classes or at least as separate identifiable aspects of the instructional process rather than integrate the concepts with regular course content. It is also plausible that in one year, it is not possible to detect larger or more educationally significant differences in the cognitive achievement of students between or among the various criterion groups than those observed in this study.

Conclusion:

It seems likely that the findings pertaining to the impact of career education on the cognitive achievement of students can best be explained in terms of a combination of the three factors previously discussed. Therefore, in order to detect a greater impact on the cognitive achievement of students in subsequent years, it may be necessary to (a) modify and improve the sensitivity of the three cognitive career education tests, (b) identify and more appropriately specify the characteristics of the control population, (c) encourage teachers to (1) place greater instructional emphasis on a broader range of career education concepts than they had done previously and (2) make career education instruction a more identifiable aspect of the instructional program. Additional efforts to evaluate these projects in subsequent years may be required in order to answer many of the questions raised by this discussion.

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